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Socio-Economic Factors Affecting Child Labor and Schooling in Rural Tigray

(The Case of Hintalo-Wejerat Woreda)

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A Thesis

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DECLARATION

I, Wellay Gebremedhin Kahsay, hereby declare that this thesis work entitled "Socio-Economic Factors Affecting Child Labor and Schooling in Rural Tigray (evidence from Hintalo-Wejerat woreda)" submitted by me in partial fulfillment of the requirements for the award of the Degree of Master of Science in Economics (Specialization in Development Policy Analysis) to the College of Business and Economics, Mekelle University, through the Department of Economics, is original work carried out by myself. To the best of my knowledge, the matter embodied in this thesis work has not been submitted earlier for award of any degree or diploma. Where other sources of information have been used, they have been duly acknowledged.

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CERTIFICATION

This is to certify that this thesis work entitled "Socio-Economic Factors Affecting Child Labor and Schooling (evidence from Hintalo-Wejerat woreda, Tigray, Ethiopia)" is Submitted to Mekelle University, College of Business and Economics through the Department of Economics in partial fulfillment of the requirement for the award of the Degree of Master of Science in Economics (Specialization in Development Policy Analysis), done by Mr. Wellay Gebremedhin Kahsay I.D No. CBE/PS 025/03 is an original work carried out by him. The matter embodied in this thesis work has not been submitted earlier for award of any degree or diploma to the best of my knowledge and belief. Where other sources of information have been used, they have been duly acknowledged.

Advisor: Tsehaye Weldegeorgis (Assistant Professor) Signature: _____

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DEDICATION

This thesis would be incomplete without a mention of the support given me by my beloved Mother, W/o Nigisti Yehidego to whom this thesis is dedicated for she kept my spirits up when I was to fail. Without her lifting me up when this thesis seemed interminable, I doubt it should ever have been completed.

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LIST OFABBREVATIONS

CSA ……Central Statistics Agency

ELFS …….. Ethiopian Labor Force Survey

ELP……..Ethiopian Labor Proclamation

FDRE……...Federal Democratic Republic of Ethiopia

IIA ……...Independence of Irrelevant Alternatives

ILO……...International Labor Organization

MNL……Multinomial Logit Model

MoE…….Ministry of Education

TGE…….Transitional Government of Ethiopia

UDHR……..Universal Declaration of Human Rights

UNCRC……United Nation Convention on the Rights of the Child

UNICEF……...United Nation International Children's Education Fund

VIF ……. Variance Inflation Factor

WB……...World Bank

ABSTRACT

This paper investigates the main socio-economic factors affecting child labor and schooling for children aged 7-14 using data collected from rural household areas of rural Tigray, particularly Hintalo-Wejerat woreda. The study adopted multinomial logit model to estimate child work-schooling outcomes. The results from the empirical analysis suggest that socio-economic factors are important determinants of child labor and schooling in rural Tigray. The main findings from the study are the existence of positive and significant association between child work and number of infants and biological relationship to the household head while age and education level of the household head, and household size among others, having significant but negative effect on child work specialization. The major determinants of school attendance include education level of the household head and average distance to the nearest school. The finding that some of the variables (number of adults & number of infants) affect work-school outcomes differently for boys and girls shows the presence of gender bias. From policy perspective, provision of productive and labor saving assets and investment in educational infrastructure should deserve essential place in the move to curb child labor and promote school attendance.

Key words: Child labor, Schooling, Poverty, Multinomial logit Model, Hintalo-Wejerat

Chapter One: Introduction

1.1 Background of the Study

For many years, child labor has been one of the biggest obstacles to social development. It is a challenge and long-term goal in many countries to abolish all forms of child labor. Especially in developing countries, it is considered as a serious issue even these days. During the beginning of the industrial revolution, children were forced to work around family farms, in factories, and in preparing food. They were working in industries and their conditions of work were very dangerous. At that time, the industry preferred children to work because children provide cheap and more flexible labor service (Basu and Van, 1998).

Indeed, child labor was almost completely reduced from the developed world. However, currently, child labor still continues to increase in developing countries because of rapid population growth, high rates of unemployment, inflation, poverty, malnutrition, bad leadership, corruption and low wages (Bass, 2004). Child labor is happening everywhere in the world particularly in low income countries and these children are working in all sectors of the economy, such as agriculture, manufacturing, fishing, construction, domestic service street vending etc. In addition to that, children are normally unregistered as employees and working in very poor and dangerous situation without social protection (Serwadda-Luwaga, 2005).

The incidence of child labor throughout the world is difficult to verify because of the lack of reliable statistics of child labor. The reason is that governments usually do not collect current data regarding child labor, and many child laborers are invisible (Das, 2012). Although reliable data is not available, ILO has estimated that the number of child laborers in 2008 were 215 million boys and girls aged between 5 and 17 worldwide, with 115 million of them working in hazardous work which could threaten their safety or health, such as handling chemicals, carrying heavy loads**,** mining or enduring long hours. This can affect their health physically, mentally and emotionally. The remaining 100 million child laborers were those aged less than 15 years old whose tasks are not hazardous but are more substantial than permitted light work. These children do not have the basic rights like access to school or health care (Aqil, 2012).

There are millions of child laborers employed both in the visible and invisible sectors. The visible sector includes agriculture, manufacturing, construction, and mining**;** while the latter category includes child laborers in the domestic economy hidden from the public eye. According to ILO (2013), the largest numbers of child laborers are working in hazardous work and the total number of child workers is increasing, even though it is illegal by law. These children are exposed to diseases and they struggle with lasting physical and psychological pain. The main cause that induces children to work is poverty, and these children work for their survival and their families (Mapaure, 2009).

Different studies show that there is a child labor incidence differences across regions, genders and sectors. For instance, Asia-Pacific region has the highest number of child laborers with (113.6 million), after that Sub-Saharan Africa (65.1 million) and Latin America and the Caribbean (14.1 million) (Muhumuza, 2012). Child labor has been a complex rural problem, as well with children helping out in the farm with their families. The vast majority of child labor is involved in agriculture. On the other hand, agricultural sector is the backbone of developing countries economy, particularly in Africa (Baker, 2008). Generally, throughout the world, rural children were more likely to be engaged in economic labor activities compared to urban children, because poverty is more prevalent in rural areas especially among those who depend on agriculture (Akarro and Mtweve, 2011). Poor rural families consider making their children work in farms may increase household's income (Serwadda-Luwaga, 2005). Rickey (2009) also points out that many rural areas lack basic services such as electricity and access to drinking water. In such cases, their children must fetch water especially girls, who are more involved in housework.

There is also gender discrimination among child laborers. Boys and girls often do different jobs and it differs by country and industry. For instance, boys are more economically active than girls in Latin American countries like Bolivia and Colombia, but in Africa such as Côte d'Ivoire and Ghana, girls are more involved in economic activities. Girls and boys can be found in different types of economic activities. For example, boys are more concentrated in manufacturing, trade, restaurants, hotels, and transport, while girls are more concentrated in agriculture and domestic work (World Bank, 2005). Edmonds (2007) assumes that boys in Bangladesh tend to engage more in industrial activities than girls. Boys are more likely to be found in fishing, wood furniture manufacturing, construction site, retail trade of grocery ,while girls are likely to work in textile, handcrafting and in private household services. Mamadou (2009) asserts that boys tend

to be engaged more in economic activities, while girls are more involved in household chores or taking care of siblings. In general, girls are often made invisible in labor whereas they represent a very large proportion of working children. This is because, parents often have to decide to send only some of their children to school, and it is often the girl who loses out (Bhat, 2010). Ray (2001) carried out a research in Nepal and Pakistan and he assumed that gender bias was more prevalent in case of Pakistan than compared to Nepal. In Pakistan boys are more likely to work longer hours than girls and rural children are poorer than urban, while it was the opposite in Nepal.

According to the ILO, there is child labor difference across sectors too. For example, throughout the world, 218 million children aged 4-15 were trapped in child labor in 2004. Of which, 126 million were in what ILO refers to as '*hazardous'* work (ILO, 2006a). Of these children, 69% were engaged in agriculture, 22% were in services, and 9% were employed in industry. The 2005 World Bank survey in Ethiopia also shows child labor difference in sectors. For example during the survey year, the majority of working children in the country were found in the agricultural sector (95.2 %), followed by services (3.4 %), manufacturing (1.3%), and other sectors (0.2%).

Empirical evidence indicates that child laborers are found mostly in developing countries and are employed mainly in agricultural and related activities (Assefa, 2002). Ethiopia is one of those countries where the majority of the labor force is engaged in the agricultural sector. The labor intensive and non mechanized system of agriculture requires human labor in general and child labor in particular. Accordingly, with in Sub-Saharan African countries, Ethiopia is one of those countries where the problem of the child work is rampant with over 40% participation rate (Assefa, 2001).

According to the 2005 World Bank Survey, in Ethiopia from children aged 5-14, 50.1% were working only, 29.2% were participating in schooling only, 17.2% were combining work and school, and the remaining 3.5% were inactive. Of which, 58.1 % of boys and 41.6% of girls were working in the country. The country's literacy rate for above 15 years of age was 36% in 2008. The gross literacy rate for adults (15-24 years of age) was 50% in the same year. During this year it is reported that only 39% and 62% of females and males respectively were literate in the country (World Bank, 2009). Overall school enrollment rate at the primary level in Ethiopia

is reported to be 82, 87, 95 and 99% from 2005 till 2008 respectively. Despite the seemingly increasing enrollment rate in the year 2008; 2,732,050 (1, 180,121 male children and 1,551,929 female) children were out of school. The lower enrollment is accompanied by lower ratio (89%) of female to male primary school enrolment (WB, 2009).

Limited access to schooling is among the factors identified as encouraging child labor. In areas where there is a little or no access to schooling, parents may consider child work as an opportunity to help their children develop a future career. According to a report by ILO, education is the key to eliminating and preventing child labor (ILO, 2006 b). Of course, school expansion may not lead to a significant reduction in participation. Imperfection in the labor force and capital market, family expectations, child trafficking and culture are other factors responsible for the high incidence of child labor world-wide.

Following the outbreak of the industrial revolution, the first legislation to prohibit child labor came in 1833, called 'The Factory Act'. The basic act was as follows: no child workers under 9 years of age , employers must have an age certificate for their child workers, children of 13-18 years to work no more than 12 hours a day, children are not to work at night, 2 hours schooling each day for children, and crucially, provided 4 inspectors to enforce the law. The idea was to remove all children from labor which interfered with school. However, many children continued to be involved as child labor which was forbidden by law (Bhat, 2011). Later on, the Universal Declaration of Human Rights (1948) conveys that, "everyone has the right to education and shall be free at least from school fee in the primary level".

To mitigate child labor, Ethiopia has adopted the UDHR (1948) convention and also ratified the ILO Convention No. 138 on the Minimum Age for Admission to Employment of the 1973 and Convention No. 182 on the Worst Forms of Child Labor of the 1999. Besides, the country has included the protection of children in its constitution which provides that children under 18 years old have the right to be protected from work that is exploitative, hazardous or otherwise inappropriate to their age, detrimental to their schooling or detrimental to their social, physical, mental, spiritual, or moral development. The FDRE (1995) constitution in its Article 36th (d) also advocates the right of a child as "every child has the right not to be subjected to exploitative practices neither to be required nor permitted to perform work which may be harmful to his/her education, health or well-being". To this effect, the Ethiopian Labor Proclamation No. 377/2003

sets the minimum age for employment at 14 and the minimum age for hazardous works at 18. The law forbids employers from using "*young workers*", defined as children ages 14 to 18, when the nature of the job or the conditions under which it is carried out might endanger the life or health of a child. The ELP also prohibits all children from working at night, and working overtime or in hazardous work, including digging tunnels, working underground, in sewers, with electric transformers, and transmission lines. Young workers are prohibited from working more than 7 hours per day, or between 10 p.m. and 6 a.m., during weekly rest days, and on public holidays.

However**,** in reality, due to the prevailing pervasive poverty and parental attitude towards work, many children in Ethiopia have not enrolled in school or are forced to drop out of school. There is ample evidence that indicates the problem of child labor poses a major challenge to children's education, especially in rural areas, where the overwhelming majority of children are involved in productive/economic activities. 85% of the country's children are engaged in some kind of productive or non-productive activities (Child Labor Survey, 2001); out of which more than two third do not get the chance of attending school. The problem is worse in the rural areas, where more than half of the working children are compelled to work to supplement family income, deprived of their right to education, to which they are entitled in international conventions and national laws and policies.

In rural parts of Ethiopia, participation of children in different forms of work activities like domestic work, herding, agricultural work, traditional gold mining and other informal sectors with hardship is common and practically observable. Ultimately, this is done at the cost of child schooling. In addition to the traditional household income related factors, children may be forced to run away into work places due to supply side school related reasons. Among such factors are lack of access to schools and high cost of schooling. All of these combined factors are believed to have an impact on the physical, mental and psychological development of the laboring child. Apart from those impacts, it hinders human capital formation by leaving the working child with little time to focus on education, thereby prolonging poverty in to future generations (Ravalion and Wodon, 2000).

Hintalo-Wejerat woreda is found in rural Tigray, where high incidence of child labor and relatively low child schooling participation is observed; hence needs intervention to improve the problem.

1.2 Statement of the Problem

Children in Ethiopia often begin to participate in work activities at their early age usually when they are 4 or 5 (Assefa, 2002; Assefa and Arjun, 2005) and on average contribute 29-30 hours of labor per week (Assefa and Arjun, 2005). Children are engaged in all forms of work, like in factories, commercial and subsistence agriculture, service, industries, shops, market places and in household chores (kifle *et al*., 2005). Engagement in economic activities at an early age and participation especially in hazardous and exploitative work could have a devastating effect on children's physical and mental development and might also cause irreversible damage leading to permanent disability (ILO, 1998).

According to the Ethiopian Labor Forces Survey (2005), in Ethiopia children do engage in work activities in various forms even when they are too young (5 years old). At the country level, 61.44% of children in the age range of 5 to 14 participate in work with similar participation rate across gender. It is observed that the participation rate is disproportionately high in the rural part where 63.52% of children in the age category engage in work as compared to 46.09% in urban parts of the county (CSA, 2006, pp. 17).

There is also a high dropout rate due to child labor. The dropout rate varies from grade to grade, region to region, and in terms of gender. As regards grade variation, it is very high in the first grade of primary education and tends to decline consistently in the next higher grades with some exceptions that are observed in grades 5 and 8. As indicated in the Education Statistics Annual Abstract (MoE, 2009/10), 28.1% of pupils enrolled in grade 1 in 2008/09 had left school before reaching grade 2 in 2009/10. This may be due to lack of early child care education, and engagement in child labor, and other related factors.

It is a general consensus that human capital accumulation is the way to out quickly from poverty and hence to ensure faster economic growth and development in any nation. Education is believed to have a special place in such endeavor. Investment in education is investment in human capital. Such investment has both private and social returns when children are enrolled in school, attend properly and part of productive society. On the other hand, non-enrollment, which

is a common problem in low income countries, is disadvantage in human capital. Such countries lose talent citizens which could have been educated and contribute to national development. The problem is that if children are forced to start work at their early ages and work for longer hours means that their ability to attend and perform well in school is seriously damaged. This indicates that child work is forgone human capital which translates to economic failures in the long run.

According to (Jensen and Nielson, 1997), poverty is the driving force behind exploitative child labor. Studies in developing countries have revealed that child labor is badly needed to supplement the subsistent income of families both in rural and urban areas restricting healthy overall development of children and which can mainly be manifested by reduced or complete absence of access to formal education.

Several studies have examined the determinants of child labor and schooling in rural Africa (Andvig, 2001) and also so far, some studies (Assefa, 2002; Assefa and Arjun, 2005; Arjun and Assefa, 2009; Beliyou, 2003; Cockburn, 2000; Cockburn, 2001; Tassew *et al.,* 2005 and; Getinet and Beliyou, 2007) have been conducted to investigate child labor in Ethiopia. Many such studies focused on child labor participation in economic activities in general at country level, and did not let the understanding of the issue in such at a specific study areas (at woreda level); and also any study to investigate determinants of child labor and schooling in the study area (Hintalo-Wejerat woreda) has not been conducted yet. Therefore, this study tries to fill the gap by investigating the major socio-economic factors affecting child labor and schooling participation in the particular place of Hintalo-Wejerat woreda, rural Tigray. It also attempts to identify certain key factors governing child labor and schooling in the new study area.

1.3 Objective of the Study

1.3.1 General Objective of the Study

- To investigate the major socio-economic factors affecting child labor and schooling in rural Tigray, particularly Hintalo-Wejerat woreda.

1.3.2 Specific Objectives the Study

- ✓ To determine the incidence of child labor in the study area.
- ✓ To assess empirically the major factors affecting child labor and school participation.
- ✓ To examine the existence of gender bias, if any, related to child work-school participation.
- ✓ To provide recommendations for policy making against exploitative child labor and hence improve school attendance.

1.4 Research Questions

1) What is the magnitude of child labor in the study area?
2) What factors affect a child whether to go to school or to work?
3) To what extent gender bias exists in child labor and/or child schooling?
4) What possible policy options are available to curb child labor and hence improve child schooling?

1.5 Research Hypothesis

i. The majorities of children devote their time to both school and work activities.
ii. Parental education level, household assets, school accessibility and biological child play an important role whether a child will go to school or to work.
iii. Female children are more likely to be engaged in domestic activities but less likely to be at school as compared to their male counterparts.
iv. The main possible solution to end child labor and promote child education is to eradicate poverty.

1.6 Significance of the Study

The future of every nation lies in her children and this can only be realized if the children are well equipped with the necessary knowledge and skills to enable them take over from the aging population. Child labor from literatures available indicates that it depends to a great extent on the income of the family and the educational level of parents concerned.

This study aims to investigate the major socio-economic factors determining child labor and schooling amongst children in the 7-14 age categories in the study area. The majority of the studies so far encompass those children aged 5-15 with some adjustments on the lower and upper age limits. Even if such works are important for the investigation of the incidence of child labor, the findings would be biased to show the right picture of trade-off between child labor and schooling, if any, since the official age to start formal education in Ethiopia is 7.

This study is expected to throw more light into the 'problem' of child labor in our society especially in the study area. It also seeks to bring awareness of the issues to the local community and how to address them. The findings from the studies will help authorities concern to know the magnitude of the problem in the study area. The result of the study will provide policy makers with helpful information to devise appropriate policies and to make competent decisions to address the issue. It will also inspire further academic work and hence broaden the frontier of knowledge in the area.

1.7 Scope and Limitation of the Study

This study is scoped to one administrative woreda, 2 *tabias* with in it and 192 children as sample units. The data of the study was based on a cross-sectional survey. The study attempts to assess the major socio-economic factors affecting child labor and schooling in the study area. It does not go forth to examine the effect of working and its duration on school performance of enrolled children and also the detrimental impacts of working would have on the health of children.

The study was subjected to some limitations. For example, some data were highly dependent on the memory of the respondents may be because of the weak recording system in the woreda. Accordingly, some data particularly the quantitative data might have some inaccuracies. Some respondents were also unwilling to give the correct response for some sensitive variables. Besides, some secondary data found at the woreda level were not clear and well documented. However, the study used different data collection method; such as random sampling method and the respondent consents in order to minimize the limitation, and ensure the reliability of the data and produce valid results.

1.8 Organization of the Paper

The paper comprises five chapters. It begins with introduction which encompasses background of the study, statement of the problem, objective, research questions, research hypothesis, significance, scope and delimitation of the study. Chapter two provides review of pertinent literature while the third chapter deals with the methodology used in the study. The forth chapter presents the major findings from the study. The last chapter concludes and puts forward policy implications.

Chapter Two: Review of Related Literature

This part assesses the vague definitions of child labor set by different scholars, societies and international organizations. It also defines the operational definition of child labor and other important terms related to child labors which have been used in the study. Furthermore, it assesses the findings of different theoretical and empirical literature reviews that enable to analyze the determinants of child labor and schooling. The review is divided in to sub-sections to see the main possible factors and variables that have been found in the study.

2.1 Concepts and Definitions of Child Labor

There is no clear and universally accepted definition of child labor owing to the fact that the nature and magnitude of the work varies across countries and societies. The term child labor has different definitions by different scholars, societies and organizations. According to Edmonds and Pavcnik (2005), child labor is viewed as a form of child labor abuse, when children work in a bad condition and hazardous occupations. Aqil (2012) assumes that not all work that children do can harm their health or considered as exploitative but it depends on what kind of work they are involved in and how many hours they work. It also depends on work conditions, or environment. However, Weston (2005) argues that any work children do, can be damaging to their health because the work can be abusive, exploitative or hazardous and it can influence their health. Omokhodion and Odusote (2006) argued that any work that children do outside home is classified as child labor. Because, working outside home is usually exposed to environmental hazards which may affect their health and safety. Huebler (2008) defines child labor as at least one hour per week of income generating activity or 28 hours or more per week in household chores.

The definition of child labor differs among societies, for example in Africa and Asia they do not consider the work of 15 years old person as a child labor, and they view child labor as a good task that children learn skills from work. They distinguish between child labor and child work, where child work is considered to be a part of the children's training to be responsible adults while child labor is thought to be exploitative (Omokhodion and Odusote, 2006).

The meaning of the term of child labor varies among organizations too. According to the UN Convention on the Rights of the Child (1989), a child labor refers "work that is likely to be

hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development". Article 1 of the UNCRC and the ILO Convention on the Worst Forms of Child Labor, 1999 (No. 182) defines a child who is under the age of 18 years (Bhat, 2011).

The ILO argues that child labor is difficult to define; and it defines child labor as follows:

i. All economic activities undertaken by children under 11years old;
ii. All economic activities undertaken by children aged 12 to 14, excluding permitted 'light work' in the sense of the 1973 ILO Minimum Age Convention (No.138);
iii. All economic activities carried out under 'hazardous conditions' by children aged 15 to 17 years old; and
iv. The worst forms of child labor carried out under18 years old in the sense of the 1999 ILO Minimum Age Convention (No.182).

UNICEF has expanded the ILO definition of child labor by emphasizing the importance of domestic work by children, that is, in addition to economic work. UNICEF defines child labor as follows:

i. Children 5 -11 years engaged in any economic activity, or 28 hours or more domestic work per week;
ii. Children 12-14 years engaged in any economic activity (except light work for less than 14 hours per week), or 28 hours or more domestic work per week; and
iii. Children 15-17 years engaged in any hazardous work.

2.2 Meaning of Child Labor and Related Terms

The following are a list of definitions given to child labor and related terms which have been used in the paper. The definitions have been compiled from authoritative sources including documents of the ILO**:**

Child Labor: refers to any work which is likely to damage a child's physical and psychological health development, plus his/her chances of fulfilling other rights, primarily the right to education.

Child Work: refers to any work which is not particularly detrimental for a child and does not harm his/her educational opportunities.

Household /Domestic Chores: domestic services provided by household members without pay. These are considered non-economic activities. Household /domestic chores include preparing and serving meals; making, mending, washing and ironing clothes; shopping; caring for children and/or the sick, in firm, or elderly persons in the household; cleaning, decorating, and maintaining the dwelling; and transporting household members and their goods.

Light Work: work which is (a) unlikely to be harmful to the health or development of boys and girls; and (b) not such as to prejudice their school attendance, or their participation in vocational orientation or training programs approved by the competent authority, or their capacity to benefit from the instruction received.

Hazardous Work: work that jeopardizes a child's health, safety, or moral development. This includes work that exposes children to physical, psychological, or sexual harm or abuse; that takes place underground or under water, at dangerous heights, or in confined spaces; that involves using dangerous machinery or tools or handling or transporting heavy loads; that exposes children to harmful substances or agents, processes, temperatures, noise levels, or vibrations; that takes place under particularly difficult conditions; that occurs for unduly long hours or during the night; or that unreasonably confines the child to the premises of the employer.

Worst Forms of Child Labor: forms of child labor that must be eliminated under the terms of the ILO Worst Forms of Child Labor Convention, 1999 (No. 182). Nations ratifying this convention must take immediate action to eliminate all forms of slavery and practices similar to slavery; the use, procuring or offering of a child for prostitution or for the production of pornography and for illegal activities; and any work which is likely to harm the health, safety, or morals of children.

2.3 Operational Definition of Child Labor

Though different definitions by different authors and organizations have been given for child labor, for the purpose of this study, child labor is defined as any activity, economic or non-

economic, performed by a child, that is either too dangerous or hazardous and/or for which the child is too small to perform and that has the potential to negatively affect his/her health, education, moral and normal development. This paper uses the terms '*child work*' and '*child labor*' interchangeably, because it is found to be unnecessary to engage in the controversy of including children's activities at home in the definition of child labor. Furthermore, it is difficult to apply the ILO's and UNICEF's definitions of child labor, as the paper is using data from children of 7 to 14 years old and the ILO's and UNICEF's definitions require a different intensity of child work for different age groups.

2.4 Review of Theoretical Literature

Even though there is a wide range of growing empirical literature on child labor, theoretical writings on the area are insufficient. Basu (1999), in his survey on the child labor literature, clearly wrote that "*Theoretical writings on the subject (child labor) are relatively few*". Though few, the theoretical writings on child labor try to address the question of why children work by bringing into view a number of demand and supply-side factors that provide its potential determinants.

Theoretical explanations about child labor emphasize on the close interdependence between household fertility decisions and the preference to engage children in work (Beliyou, 2003). Baland and Robinson (2000) explain the phenomenon by emphasizing on the time inconsistency problem faced by parents. The authors specify that parents may overuse child labor to secure old age savings while denying them access to formal education.

Basu and Van (1998) proposed the assumption that subsistence poverty causes child labor. The model is based on two fundamental assumptions: the Luxury Axiom and the Substitution Axiom.

The Substitution Axiom: argues that child and adult labor are close substitutes. In situations of paid employment child labor could have adverse labor market effects by increasing adult unemployment. On the other hand, child labor may be employment enhancing if children are engaged in domestic and unpaid activities thereby enabling adult household members to go for remunerative outside home employment.

The Luxury Axiom: assumes that below a certain wage level, households do not let their kids work .The household will send their children to the labor market only if the income from non-child labor sources falls below the subsistence level.

Another aspect of theoretical explanation on why children do work is the poverty hypothesis. Families that allocate their time optimally between various forms of work and school seemingly compare the current value of the child's labor against the future value of increased productivity of an educated worker (Drusilla, 2001). Basu *et al*. (2010) suggest that the possibility of a non-monotonous relation between land and child labor. According to the authors, poverty remains the primary cause of child labor. They argue that, since in developing countries the labor market is imperfect, when a household acquires some land, the land itself generates employment possibilities, so children's labor participation rise as land rises. Basu *et al*. (2010) talk about a perverse response to greater wealth. However, if the land continues to rise and exceeds a maximum of land holding, household becomes so wealthy that it will no longer make its children work. So, children labor participation begins to fall as land continues to rise. The authors suggest the possibility of an inverted U relationship between labor and land holdings.

Despite their differences in their initial assumptions, the existing few theoretical explanations have the central idea that child work-school decisions are made by parents on behalf of children and that child labor should be reduced for it is socially undesirable.

2.5 Review of Empirical Literature

2.5.1 The Effect of Poverty on Child Labor

Poverty create many problems such as child labor, prostitution, corruption, robbery, increased unemployment, poor living conditions, malnutrition etc. (Owolabi, 2012; Ekpenyong and Sibirii, 2011). There exists a controversy about the poverty-child labor relationships. Many researchers such as Amin, Quayes and Rives (2004), Rogers and Swinnerton (2004) and (Bhat and Rather, 2009); note that poverty is the main notable cause for child labor. In most cases, parents are forced to send their children to work just for mere survival. According to Khanam and Rahman (2008), economic development of a country has a negative impact on the incidence of child labor; that is countries with very low per capita income, such as Sub-Saharan African countries, are experienced with high incidence of child labor. Rena (2009) shows that poverty and underdevelopment drives child labor. She found that the high prevalence of poverty amongst

countries, including Ethiopia, India, China, Bangladesh, Pakistan, Sri Lanka, Papua New Guinea, Uganda, Mozambique, Malawi, Sudan, and Chad increases the child labor.

When we come to micro-level evidences, household decision making for child labor exists because of intolerable situation of a household. The study of Hazan and Berdugo (2002) confirms that child labor is a consequence of poverty. However, despite the seemingly clear link between poverty and child labor, the evidence for a significant income effect is mixed. The relation of household income and child labor in micro-data tends to be non-linear and, in many cases, is weak (Bhalotra and Tzannatos, 2003). An insignificant income effect is reported in Ilahi (2001) for rural boys in Peru, and Ersado (2005) for urban children in Zimbabwe. In a review of empirical studies of Côte d'Ivoire, Ghana and Zambia, Canagarajah and Nielsen (2001) also conclude that there is not much evidence that supports the view that poverty is a significant cause of child labor.

Bhalotra and Heady (2003) provide a justification for the positive coefficient. They explain that owning land has both wealth and substitution effects on a household's supply of child labor. The wealth effect suggests that large landholdings generate higher income, making it easier for households to give up the income that child labor brings. However, because of geographical inaccessibility to workers, or lack of information flows, large landholders may find it cheaper to hire own family members rather than other laborers. Bhalotra and Heady(2003) test this model by looking at households in Ghana that run their own farms and find that richer households in developing countries tend to own more land, and households tend to employ family members (including children) on this land. Consequently, richer households, on average, make greater use of child labor than poorer households. This theory is also supported by Dumas (2007), who looks at rural households in Burkina Faso and finds that child labor seems to be due to the absence of labor market rather than to household subsistence needs.

According to Cartwright (1999); and Cigno and Rosati (2000), negative income effects are found in rural Colombia and rural India for wage work respectively. Amin *et al.* (2004), also find a negative income effect for both urban and rural boys and girls in Bangladesh, as do Rosati and Tzannatos (2000) in Vietnam, Liu (1998) for wage work in Vietnam, Ray (2000) in Peru, Bhalotra and Heady (2000) for rural farm work for boys in Pakistan and girls in Ghana, and

Ersado (2005) for rural children in Nepal, Peru, and Zimbabwe find a negative income effect for both urban and rural boys and girls in Bangladesh, and also Ersado (2005) for rural children in Nepal, Peru, and Zimbabwe.

Edmonds (2005) finds that income growth in Vietnam can account for a large part of the reduction in child labor observed there during the 1990s. Carvalho (2000) examines the introduction of an old-age pension in Brazil and finds that it resulted in a reduction in child labor amongst children living with grandparents, with the impact of a grandmother's pension on her grand daughters' labor being especially large. Edmonds (2006) looks at how cash transfers affect child labor in South Africa and documents large declines in total hours worked when black South African families become eligible for social pension income. Schady and Araujo (2006) study cash transfers in Ecuador and find that the transfers have a large negative impact on work, about 17 percentage points. Considering these studies have less methodological problems than cross-sectional data (Edmonds (2001) is based on two years of data and the rest are natural experiments). Bhalotra and Tzannatos (2003) postulate that the variance of the income effect in different studies might come from methodological issues rather than actual country variations. However, Bourguignon, Ferreira, and Leite (2002) and Cardoso and Souza (2004) find that, in Brazil, conditional income transfers requiring a child to go to school had no significant impact on the incidence of child labor.

A study in Ethiopia reveals that both poverty constraints and income opportunities play important roles in the decision to send children to school or to work. It is also found that work and school conflict considerably but not entirely (Cockburn, 2001). In rural parts of the country household poverty is caused by large family size, increasing fragmentation of farm land that ultimately leads to low family income. Instead they tend to encourage and even sometimes force their children to inter into the labor market in their early ages so as to enhance the household income to sustain the families. Considering the extreme poverty, the use of child labor in on farm and off farm activities and in other sectors of the economy has become not a matter of choice (Tassew *et al*., 2005).

In conclusion, according to the studies of Edmonds and Pavcnik (2005); O'Donnell *et al.* (2005) and Akarro and Mtweve (2011) tackling poverty can be a perfect solution to reduce child labor.

2.5.2 The Effect of Poverty on Child Schooling

Rosati and Tzannatos (2006) find that the effect of income on schooling in Vietnam is non-linear and that the significantly positive effect of income on the probability that a child will only go to school decreases with the level of income. Edmonds (2006) finds that cash transfers in the form of pensions lead to large increases in child schooling in South Africa. Schady and Araujo (2006) study cash transfers in Ecuador and find that the transfers have a large, positive impact on school enrollment, about 10 percentage points, perhaps partly because some households believed that there was a school enrollment requirement attached to the transfers (though not monitored or enforced). Similarly, Cardoso and Souza (2004) found in Brazil that conditional income transfers requiring a child to go to school increased the likelihood of schooling.

Ersado (2005) finds no significant income effect on child schooling for urban children in Nepal, Peru, and Zimbabwe. In fact, higher income can lead to more schooling even in regions where higher income leads to more child labor. For example, Bhalotra and Heady (2003) find that in Ghana and Pakistan income has a significantly positive effect on child schooling attendance even though larger farm size leads to richer households employing more child labor.

2.5.3 The Effect of Parental Education on Child Labor and Schooling

Parents' education plays an important role whether a child will go to school or work. In Pakistan (Lahore region), majority of child laborers belong to illiterate families (Khan, 2001). Educated parents are aware of about the worth of educating their children; whereas illiterate parents consider schooling as wastage of time and money. So there is an inverse relation between parent's education and supply of child labor. Parent's education particularly mother's education is vital to keep a child in school. Emerson and Souza (2008) find that in Brazil, both father's and mother's education have a negative effect on child labor and a positive effect on schooling for both boys and girls. Kruger (2007) finds the same effects in Brazil for parents' education.

Bhalotra and Heady (2003) find that the father's education has a negative effect on the probability that rural girls in Pakistan work, but no effect on work for rural boys in Pakistan or for rural boys and girls in Ghana. The father's education does, however, have a positive effect on school attendance for rural boys and girls in both Pakistan and Ghana. The mother's education has a significantly negative impact on child labor for rural boys in Ghana, and rural boys and girls in Pakistan, and a significantly positive effect on schooling for rural girls in Pakistan, and

rural boys and girls in Ghana. It has no effect on labor for rural girls in Ghana and no effect on schooling for rural boys in Pakistan.

Using a multinomial logit, Ersado (2005) finds that the years of the mother's education have a significantly positive effect on schooling for rural and urban children in Nepal and Zimbabwe and urban children in Peru, and a significantly negative effect on child labor for rural children in Nepal and rural and urban children in Zimbabwe. However, he finds no significant effect of the mother's education on schooling for rural children in Peru or on child labor for urban children in Peru, and a significantly positive effect on child labor for rural children in Peru. With regard to the father's education, Ersado found no effect on schooling for urban children in Zimbabwe and no effect on child labor for all children in Zimbabwe and rural children in Peru and Nepal, a significantly positive effect on schooling for rural children in Zimbabwe and all children in Peru and Nepal, and a significantly negative effect on child labor for urban children in Peru and Nepal. Using a fixed-effect logit model, Tunali finds no parental education effects in Turkey, but the probit analysis by Dayioglu (2006) shows that the mother's and father's education levels have a strong negative correlation with child labor in Turkey.

2.5.4 The Effect of Land Size on Child Labor and Schooling

The vast majorities of working children live in rural areas and work on farms, predominantly family-run farms (Bhalotra and Tzannatos, 2003). As mentioned in the previous section on poverty's effect on labor and schooling , the lack of a labor market can lead to children being used for labor on a large farm, despite the increased wealth that owning land brings the household (Bhalotra and Heady 2003).

Distinguishing boys and girls and restricting the sample to rural farming households, Bhalotra and Heady (2003) find a positive effect of farm size on girls' work in rural Pakistan and Ghana, though no effect for boys. They also find a negative effect on school participation for rural girls in Pakistan, though no effect for girls in Ghana or for boys. Cigno and Rosati (2000) find a positive effect of land size on child labor in rural India, combining data on girls and boys. Rosati and Tzannatos (2006) find that in Vietnam, the size of cultivable land owned by the household raises the probability that children will combine work with school and the probability of full-time

work as opposed to studying full time. They also find that relative to study, unsurprisingly, owning land reduces the probability that a child is idle.

2.5.5 The Effect of Household Size and Birth Order on Child Labor and Schooling

Statistics in Pakistan show that the bigger the family size, the greater the likelihood that the children will work rather than attending school (Khan, 2003). This is because families with large number of children cannot afford schooling costs of all the children; so some children start working to support themselves and their school going siblings. In Nigeria, older siblings often contribute more to the family income and younger children are more likely to go to school than older children and mostly boys attend schools than girls (Ahmad, 2012; Boyden J. and Myers, 1998). Okpukpara *et al*. (2006). Khanam and Rahman (2007, and2008) note that older children are more likely to be sent to work than their younger siblings. The reasons may be mentioned that earlier-born children could be more productive to command higher wages or be more able to do household work or farming activities because of their higher innate abilities. This may encourage parents to choose their older children for work. Further, as young family earners, parents may not have sufficient income to send their earlier born to school, as the earning schedule goes up with age.

Since size and composition are clearly correlated, the relation between household size and child work will depend upon whether household composition is held constant. In empirical results, there is a tendency to find a positive association of household size and child work. However, this finding cannot be regarded as strong since the studies differ in whether or not land size and household composition are held constant (Bhalotra and Tzannatos, 2003). Bhalotra and Heady (2003), controlling for these factors, find negative effects of household size on child's labor participation for boys in rural Pakistan and girls in rural Ghana with no effect for girls in rural Pakistan or boys in rural Ghana. They also find positive effects of household size on child school participation for boys and girls in rural Pakistan and girls in rural Ghana, with no effect for boys in rural Ghana.

In Vietnam, Rosati and Tzannatos (2006), after controlling for total number of children, find a significant negative effect of household size on the probability of being in work and on the probability of combining work and school, relative to the probability of simply being in school for both 1993 and 1998 surveys. There is no effect for the children who report being in neither

work nor school. Amin *et al*. (2004) find a significantly positive effect of household size on all groups of boys (rural/urban, younger/older) and all girls except urban older girls, for whom they find no effect, though they do not control for household composition.

2.5.6 The Effect of Household Head Gender on Child Labor and Schooling

The study of Bhalotra and Heady (2000) finds that if female headship significantly raises child labor participation at a given level of income, then it must indicate a degree of vulnerability of the household that is not picked up by household income. Bhalotra and Tzannatos (2003) hypothesize that this could be the result of a female-headed household's borrowing ability or, more generally, its ability to deal with a crisis, its perception of the range of job alternatives available to it, or its assessment of its human capital. The result is also consistent with women being less altruistic towards children than men. However, other empirical evidence indicates this is not the case (example, Rubalcava, Teruel, and Thomas (2009) find that women allocate more resources toward investment in the future, Cardosa and Souza (2004) find that cash transfers to women have a larger positive effect on schooling than transfers to men).

Bhalotra and Heady (2003) find a positive effect of female headship on the labor participation rates of boys and girls in rural Pakistan and for girls in rural Ghana (with no effect for boys in rural Ghana). They find no effect of female headship on child schooling for any of the groups. Amin *et al*. (2004) find that in Bangladesh, female headship is positively correlated with child labor for most of the groups of children (except for rural older boys, where there is no effect). Ersado (2005) finds no effect of female headship on schooling or labor for the majority of the children in Nepal, Peru, and Zimbabwe.

Ray (2000) finds no relationship between child labor and female headship for children in Peru and Pakistan, but does find a positive relationship between female headship and schooling for girls in Pakistan (no effect for the boys in Pakistan or children in Peru). This is consistent with empirical evidence indicating that the higher altruism of mothers is often focused more on girls than boys (example, Duflo (2003) finds that grandmothers give more of their pension to their grandchildren than grandfathers, and more to granddaughters than grandsons).

2.5.7 The Effect of Age of Household Head on Child Labor and Schooling

This is an indicator of the stage of the life cycle that the household is at. If the oldest male reports as head, this variable may also indicate whether the child lives in a vertically extended household, with grandparents. If the equation also includes a full set of age-gender variables that reflect household composition, the age of the household head has a less clear meaning and a weaker role to play (Bhalotra and Tzannatos 2003). Perhaps because of this fact, most studies do not include this in their model. Those studies that do include it and find it significant do not have full controls for household composition, example Nielsen (1998), Ray (2000), Cardoso and Souza (2004), Ersado (2005), and Emerson and Souza (2008).

2.5.8 The Effect of Child Relation to Household Head on Child Labor and Schooling

Households in developing countries are large and complex and often contain not just vertical but also horizontal extensions (Bhalotra and Tzannatos, 2003). As a result, nephews, nieces, sisters-in-law, and grandchildren may be counted amongst children along with sons and daughters of the head of household. Additionally, in Sub-Saharan Africa, there is a high prevalence of child fostering and orphans. Assuming that the head plays the primary role in decisions regarding child labor, an interesting hypothesis is that the children of the household head are preferred and hence less likely to work.

Cockburn (2001) investigates this variable in probit estimations for work and school in Ethiopia and finds that children of the household head are more likely to attend school. In contrast, Bhalotra and Heady (2003) find that children of the head are more likely to be in work in rural Pakistan but in rural Ghana, sons are less likely to be in work (no effect for daughters). They also find no effect on schooling for sons in rural Pakistan or for sons and daughters in Ghana, but a negative effect on schooling for daughters in rural Pakistan. However, Blunch and Verner (2001), also analyzing data from Ghana, find that being the child of the head is positively correlated with child labor for rural boys, negatively correlated for urban girls, and has no effect.

Based on data from Uganda, Bishai *et al.* (2003) show that biological relatedness is a strong predictor of the quality of care offered to children. Evidence from the Demographic and Health Surveys for 10 countries in sub-Saharan Africa in which households were interviewed between 1992 and 2000 shows that orphaned children in Africa live, on average, in poorer households and

are significantly less likely than other children to be enrolled in school. The lower school enrollment of orphans as compared with other children is not explained by their greater average poverty since orphans are less likely to be in school than non-orphans with whom they co-reside. This suggests that distant relatives and unrelated caregivers invest less in orphaned children than in their own children or closer child relatives (Case, Paxson and Ableidinger, 2004).

2.5.9 Gender Differentials in Child Labor and Schooling

Rosati and Tzannatos (2006) use a multinomial logit model to show that females are more likely to be working full time (compared to full-time study), and that they are just as likely to be combining work and school (relative to full-time study). Ersado (2005) finds that girls are more likely to work in Nepal and Zimbabwe.

For children in Peru (Ersado, 2005), Ecuador (Sasaki, 2000), and for older children (aged 12-14) in Bangladesh (Amin *et al.*, 2004), it is found that girls are less likely to work than boys. Deb and Rosati (2004) find that girls are more likely to be idle (neither work nor school) in Ghana and India, but they assert that this may just reflect the fact that girls are expected to perform household chores (which are not picked up by their surveys).

School enrollment is higher for boys than for girls in Nepal and Zimbabwe (Ersado, 2005). However, in some countries of Latin America (Colombia, Paraguay, Nicaragua), studies find that girls are much more likely to go to school than boys. Boys often leave school after completing the basic primary cycle while girls continue schooling for a few more years. This finding is consistent with the higher labor force participation of boys mentioned earlier. However, Ersado (2005) finds that in Peru, despite females being significantly less likely to work, they are significantly less likely to go to school. Child domestic labor also has a gender element as those burdened with household chores are generally girls. These girls are also particularly vulnerable to sexual exploitation and abuse (UNICEF, 2009).

2.5.10 The Effect of Child Age on Child Labor and Schooling

In Bangladesh, Amin *et al.* (2004), using a linear term for age, find that child labor increases with age for rural and urban older boys (aged 12-14), rural younger boys (aged 5-11), and urban younger girls, but has no effect for urban younger boys, urban older girls, and rural older and

younger girls. For the case of Columbia, Cartwright (1999) finds that the probability of children working increases with age. In urban Bolivia, Cartwright and Patrinos (1999) find that age increases the probability that a child will work (full time or a combination of work and school). Similar results with respect to age are found for Ecuador (Sasaki, 2000), Brazil (Emerson and Souza, 2008), and Ghana and Pakistan (Bhalotra and Heady, 2003). Rosati and Tzannatos (2006) in Vietnam use a multinomial logit model and find that age has a quadratic (concave) effect on the probability that a child works only and the probability that a child works and studies, relative to study only.

Other studies that have used a linear variable for age usually find a negative relationship between schooling and age, including, Ersado (2005) in Nepal, Peru, and Zimbabwe, and Bhalotra and Heady (2003) in Pakistan.

Chapter Three: Research Methodology

3.1 Brief Description of the Study Area

3.1.1 Location and Topography of the Study Area

Hintalo-Wejerat is one of the 4 woredas of the south east zone of the regional state of Tigray. The capital of the woreda known as Adigudem is 37 km far to south from the capital of the regional state of Tigray, Mekelle. The neighboring woredas around it are; Raya-Azebo to the south east, Saharty-Samre to the west, Emba-Alaje to the south, Enderta to the north as well as the Regional State of Afar to the east. The woreda is found at an elevation ranges from the lowest 1,825 meters to the highest 2,625 meters above sea level.

The climate classifications are *Kolla* (22.5%), *Weina-Dega* (63.75%), and *Dega* (13.75%). Its topography constitutes large mountainous areas to the south and south east parts and low lands to the north direction. Barley and wheat are the two most common types of crops growing at many areas of the woreda. It receives an average rain fall that ranges from the lowest 336mm to the highest 933.75mm per annum. The total area of the woreda is about 1933.09 km^2.

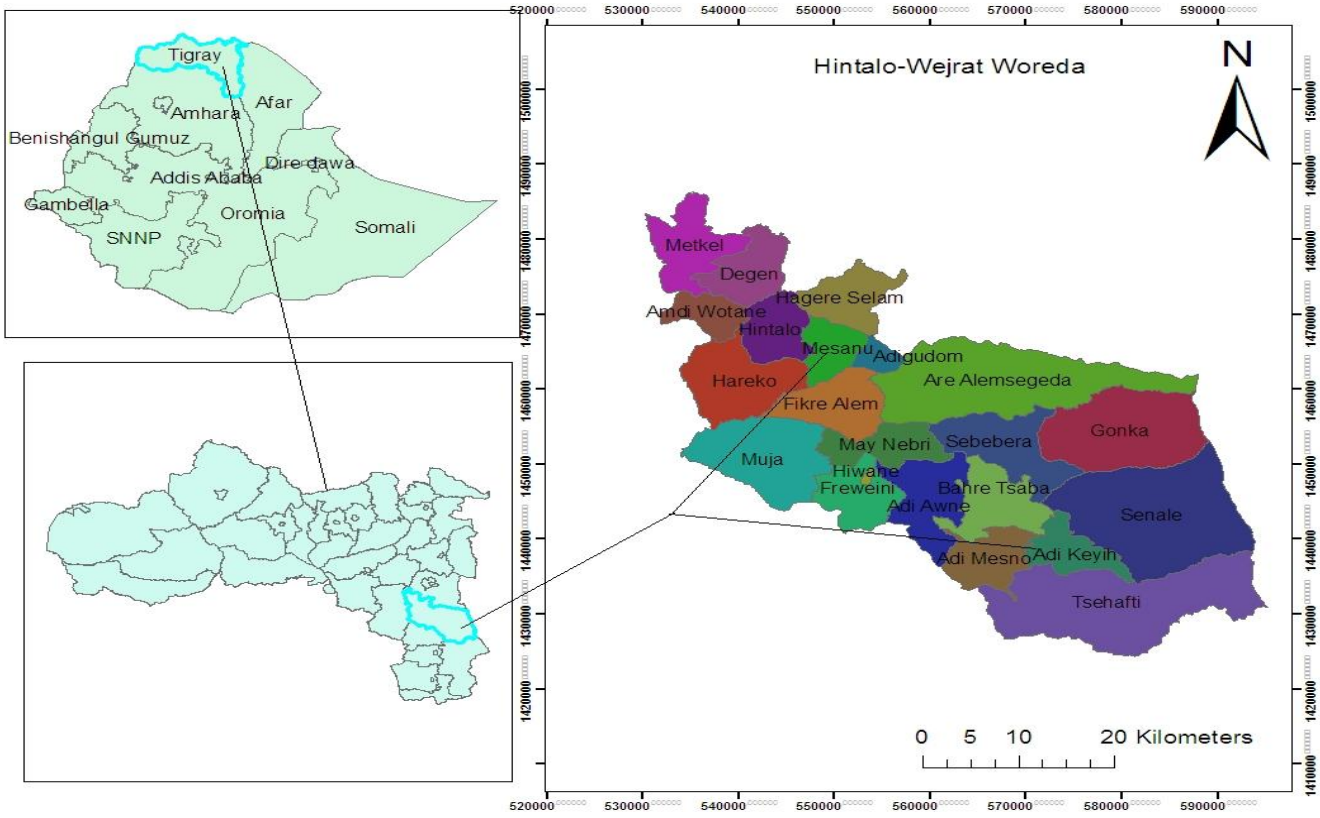

Figure 1: Geographical Location of the Study Area

3.1.2 Population and Settlement Structure of the Study Area

The total population size of Hintalo-Wejerat worerda is about 180,739; with 88,950 males and 91,789 females. Of which, 41,915 are total household heads; with 31,338 males and 10,577 females. Around 92% of the total population of the woreda depends on agriculture for its livelihood. Administratively, the woreda is divided in to 22 *tabias*. Of the total population, 19,530 (9,646 males and 9,884 females) lives in urban areas. The total population who lives in rural areas accounts 157,024. Of which, 77,249 and 79,775 are males and females respectively. When we see the religious composition, nearly 99% of the total population is Christian. The remaining *1%* is Muslim (evidence, Hintalo-Wejerat Woreda Plan and Finance Development Office, 2014).

3.2 Data Types, Sources and Collection Methods

Two types of data are used in this work; namely, primary and secondary data. The primary data was collected using in-depth interviews and questionnaires. Results from these sources form the basis of the analysis. The primary data was obtained from heads of households and *tabia* administration bodies using a structured questionnaire which was prepared in English and translated in to Tigrigna language.

Secondary sources of data involved an intensive reviewing of relevant annual reports of the woreda. It was obtained from offices such as Plan and Finance Development Office, Education Office, and Labor and Social Affairs Office of the targeted woreda, Hintalo-Wejerat. This is to further supplement the data that is gathered during the fieldwork.

The primary data was collected in the field through the use of both qualitative and quantitative methods. To collect the primary data, 5 data collectors were recruited from those who completed at least 10^{th} grade supposed that they are matured and have know-how in managing and administering the questionnaires and the data collection processes carefully. Before the beginning of the data collection process, one day's orientation has been given to enumerators on the objectives of the study and the approaches and methodologies which they have to follow to capture the reliable data.

3.3 Sampling Design and Procedures

The study used simple random sampling method to select the sample unit. At the beginning, Hintalo-Wejerat woreda was purposefully chosen simply because of the researcher's financial constraints and also because of scientific researches regarding factors determining child labor and schooling has not been made yet in the study area. Secondly, out of the 22 *tabias* found in the woreda, two (Adi-Keyh and Mesanu) were selected using simple random sampling method. Thirdly, 192 children (95 boys (49.5%) and 97 girls (50.5%)) aged 7-14 have been selected randomly from 526 sample frame as a sample unit. The targeted *tabias* have been given equal quota of sample unit i.e. 100 children for each. Because, their population size was found to be similar during the study time. To capture all the relevant data, household heads of the targeted children have been asked using structured questionnaire.

According to the Ethiopian Labor Law, the minimum age to start work is 14 (TGE, 1993). In addition to this, it is commonly known that the national starting age to formal schooling in Ethiopia is 7. It was from this reason that the age range (7-14) of the children was purposefully incorporated in the study to see the magnitude of the problem.

3.4 Methods of Data Analysis

To answer to the research questions stated above, both econometric and descriptive statistical tools were employed. Multinomial Logit model has been used to try to analyze about how the various explanatory variables affect the dependent variable. The collected data was entered, coded and cleaned for missing values, if any, and transferred to and analyzed by using econometric software called STATA.

3.5 Specification of the Model

In an attempt to investigate the determinants of children's participation in different activities, the empirical model used to analyze the data is MNL model (Maddala, 1983, and Crammer, 1991). For regresseors that are invariant across alternatives, the appropriate model is the MNL. The advantage of this model is that it allows the analysis of decisions across more than 2 categories enabling the determination of choice probabilities for different categories of child exploitation. This approach is more appropriate than the *Tobit* and *Probit* models which have 2 dichotomous alternatives (Nkamleu, 2009). The MNL has **S** possible states or categories that are S= 1, 2, 3, --- S which are exclusive and exhaustive (Crammer, 1991).

At the heart of the MNL model is the assumption of the Independence of Irrelevant Alternatives (IIA). IIA states that for any individual, the ratio of probabilities of choosing two alternatives is independent of the presence or attributes of any other alternative. The premise is that other alternatives are irrelevant to the decision of choosing between the two alternatives in the pair. The ratio of probabilities for each alternative depend only on the attributes of those alternatives and not on attributes of third alternative and would remain the same regardless of whether that third alternative is available or not. In effect, IIA argues that there are neither substitutes nor complements for the alternatives. The major implication of the IIA property is that it allows additions or removals of an alternative from the choice set without affecting the structure or parameters of the model. The IIA assumption has been tested using Husman test. The basic approach in the test is to compare the outcomes when some alternatives are included and excluded.

The Multinomial Logit model is specified as follows:

Child Activity = $\beta_0+\beta_1$Child-Age$+\beta_2$Child-Age$^2+\beta_3$Child-Sex$+\beta_4$Bio-Child$+\beta_5$Head- Sex$+\beta_6$ Head-Age$+\beta_7$Head-Lit$+\beta_8$Head$_{1\text{-}6}+\beta_9$Head$_{7\text{-}12}+\beta_{10}$#HH-Size$+\beta_{11}$#Male$_{15\text{-}65}+\beta_{12}$#Female$_{15\text{-}65}$ $+\beta_{13}$#Females$+\beta_{14}$#Infant<5$+\beta_{15}$Depratio$+\beta_{16}$#Oze $+\beta_{17}$ #Oxen$+$ β_{18}L.Size$+\beta_{19}$#P.Lands$+\beta_{20}$Off-farm$+\beta_{21}$Business$+\beta_{22}$L.Sharing$+\beta_{23}$Remit$+\beta_{24}$Dis-Sch$+\beta_{25}$Sch-Exp$+\varepsilon i$…… (a)

Where, the variables are as defined in the table 1 below; εi is the disturbance term of the equation.

The study assumes that the child's unit time endowment can be used for 3 mutually exclusive activities. At a particular time, a child could be only attending school, only working, working and attending school at the same time. This gives rise to a polychotomous choice framework. Hence the probability of a child having activity j (j=1 school only; j=2 both work and school; j=3 work only) is given by the following MNL model.

$$\text{Prob}(Y_i = j) = \frac{\text{Exp}(\alpha_i+\beta_j)}{\sum_k \text{Exp}(\alpha_k+\beta_k)} \quad \text{for j, k=1, 2, 3, ……..} \quad \text{(b)}$$

The multinomial probability model assumes that the possible distinct states are exhaustive in that they cover all possibilities.

The likelihood function for a sample of *N* independent observations is then:

$$LN = \prod_{i=1}^{N} \prod_{j=1}^{m} p_{ij}y_{ij} \ldots\ldots\ldots\

Where the subscript *i* denotes the i^{th} of *N* individuals and the subscript *j* denotes the j^{th} of *m* alternatives.

The log-likelihood function is:

$$L = 1n\ LN = \sum_{i=1}^{N} \sum_{j=1}^{m} y_{ij}\ 1n\ p_{ij} \quad \text{.....(d)}$$

Where $P_{ij}=F_j\ (x_i, \beta)$ is a function of parameters β and regressors. More generally, the number of alternatives may vary across different individuals, so that *m* choices become *mi* choices.

The first-order conditions for the Maximum likelihood estimator β are that it solves

$\frac{\partial L}{\partial \beta} \sum_{i=1}^{N} \sum_{j=1}^{m} \frac{yij}{pij} \frac{\partial pij}{\partial \beta ij} = 0$, which is usually one linear in β. The distribution of y_i is necessarily multinomial that ensures consistency as then $E[y_{ij}] = p_{ij}$.

Maximizing the logliklihood function with respect to the parameters:

$$\frac{\partial LL}{\partial \beta k} = \sum_i [y_{ik} - p_{ik}]$$

$$\frac{\partial pij}{\partial \beta j} = p_{ij}x_{ij} - p_{ij}p_{ij}x_i \qquad \text{, For } j \neq k, \ \frac{\partial pij}{\partial \beta j} = - p_{ij}p_{ij}$$

The Second-Order Condition becomes:

$\frac{\partial L}{\partial \beta i} \frac{\partial L}{\partial ' k} = -\sum_{i=1}^{N} \sum_{j=1}^{j} p_{ij}(\delta_{ij} - p_{ij})\ x_i x'_i$ where δ_{ij} is an indicator variable equal to 1 if j = k and equal to 0 if $j \neq k$.

Unlike the standard regression analysis, the parameter value (β) is not directly interpretable as the effect of the change in the explanatory variable on the mean or expected value of the dependent variable. In particular, for MNL models a positive regression parameter does not mean that an increase in the regressor leads to an increase in the probability of that alternative. Instead, interpretation for the MNL model is relative to the reference or base category group, which this study used school only as a base category.

The coefficients need to be adjusted to be marginal effects in the case of the logit model. In other words, the marginal effect, which gives the partial derivatives indicating the change in the probability of the dependent variable relative to a unit change in one of the independent variables, needs to be computed. As the relationship between the regressors and the absolute probabilities in non-linear, marginal effects vary according to the choice of vector X_s and, consequently, they will vary among individuals according to the point of evaluation. By

differentiating the MNL model, we find the marginal effects of the explanatory variables on the probabilities:

$$\frac{\partial pij}{\partial xi} = p_{ij}(\beta_j - \bar{\beta}) \ldots\ldots\ldots\

Table 1: Variables of the Model and their Definitions

Variable	Definition	Hypothesized Signs	
Child Activity	Main activity of a child (1 if schooling only; 2 if both schooling and working; and 3 if working only)	For School & Work	For Work Only
Child Characteristics			
Child-Age	Age of child	+	+
$ChildAge^2$	Age of child squared	−	+
Child-Sex	Dummy for the sex of the child (1 if male, 0 otherwise)	−	+
Bio-Child	Dummy for whether a child is biological child of the household head (1 if the head's biological child, 0 otherwise)	+	−
Household Characteristics			
Head-Sex	Dummy for male-headed household (1 if male; 0 otherwise)	−	+
Head-Age	Age of household head in year	_	+
Head-Lit	Dummy for household head's literacy level(1 if literate, 0 otherwise)	+	_
$Head_{1\text{-}6}$	Household head has 1-6 years of education	+	_
$Head_{7\text{-}12}$	Household head has 7-12 years of education	+	_
#HH-Size	Number of household members	+	_
$\#Male_{15\text{-}65}$	Number of male household members aged between 15 and 65	+	_
$\#Femal_{15\text{-}65}$	Number of female household members aged between 15 and 65	+	_
#Females	Number of female members in the household	+	_
#Infants< 5	Number of infants less than 5 years old	_	+
Depratio	Dependency ratio calculated as the ratio of infants below 5 years old and elderly aged above 65 to the total household size	_	+
Household Assets			
#Oze	Number of livestock other than oxen the household owns	_	+
#Oxen	Number of oxen the household owns	+	_
L.Size	Land holding in hectares	_	+
#P.Lands	Number of plots of land a household owns	_	+
Off-farm	Dummy for household involvement in off-farm activities (1 if at least one household member participates in off-farm activities, 0 otherwise)	+	_
Business	Dummy for household involvement in other income generating activities (1 if at least one household member participates, 0 otherwise)	+	_
L.Sharing	Dummy for household engagement in labor sharing arrangements (1 if the household participating in sharecropping, 0 otherwise)	+	_
Remit	Dummy for household receipt of remittance (1 if household receives remittance, 0 otherwise)	+	_
School Related Factors			
Dis-Sch	Distance to the closest primary school in minutes	_	+
Sch- Exp	Household average school expenditure per enrolled child	-	+

Chapter Four: Discussion of Results

Cognizant of the detrimental factors of child labor on the overall development of children on whom tomorrow depends, the international community has legislated against it. Being the primary responsible body in this arena, the ILO has devised two major conventions (Convention No. 138 on the Minimum Age for Admission to Employment, 1973 and Convention No. 182 on the Worst Forms of Child Labor, 1999) which obligate signatory countries to act in accordance with the convention. Many of the signatories have tried to incorporate the legislation in to their domestic laws. Yet, child labor has continued being global and complicated phenomenon. The situation would have been improving in countries who had signed for those conventions. Despite the fact that Ethiopia has ratified both conventions, there is no specialized body with the primary responsibility of mitigating child labor. Even the existing legal provisions about child rights are far from implementation in the rural parts of the country, where the vast majority of children reside and where child labor is pervasive.

To allow better understanding of the seriousness of the issue, this part presents the analyses of the descriptive and econometric results using data collected from Hintalo-Wejerat woreda.

4.1 Descriptive Statistics

4.1.1. Child Work-School Participation

The main activities of a child have been classified in to 3 categories. These activities include school only, combining school with work, and working only. The activities are discussed below based on the data which is being available from flied survey.

School Only: as clearly observed from table 2 below, male children (37.3%) are more likely to specialize only in school activity than their female (23.5%) counterparts at the lower age group (7-10). Similar condition has been observed at the higher age group (11-14) too, that is 29.6 and 20.8% of male and female children respectively have been participated in schooling only. In a similar fashion, there is a big sex difference in participation of school only at the sum level of age group (7-14). Hence, 33.7% boys and 23.7% girls specialized in school only. The evidence shows that boys are generally preferred to be at school only as compared to their girls counterparts, probably because of cultural influences. Generally, as age of children increases, their probability of specializing in school activity decreases in both sexes and age groups.

Combining School with Work: as indicated in table 2 below, at both the lower and the higher age groups, girls(44.9 and 52.1%) are more likely to combine school with work than their boys (39.2 and 38.6%) counterparts. Besides, girls (48.5%) are more likely to combine school with work than boys (38.9%) at the sum level age group (7-14). Generally, as girls' age increases, the likely of combining school with work increases by a higher percentage than the boys'.

Work Only: As seen in the table below, as age of male children increases, the probability of engaging in work only increased from 23.5 to 31.8%, while decreased from 28.6 to 27.1% for females, at both sexes and age groups.

Generally, there is a higher rate of child participation in the joint activities i.e. school and work (43.8%) followed by specializing in school only (28.6%) and work only (27.6%).

Table 2: Main Activity of Children by Age Group and Sex (%).

Main Activity	Age 7-10				Age 11 – 14				Age 7-14					
	M		F		M		F		M		F		T	
	No.	%	No.	%	No.	%	No.	%	No.	%	N0.	%	No.	%
School only	19	37.3	13	23.5	13	29.6	10	20.8	32	33.7	23	23.7	55	28.6
School& Work	20	39.2	22	44.9	17	38.6	25	52.1	37	38.9	47	48.5	84	43.8
Work only*	12	23.5	14	28.6	14	31.8	13	27.1	26	27.4	27	27.8	53	27.6
Total	51	100	49	100	44	100	48	100	95	100	97	100	192	100

Source: Calculated from own survey, 2014.

*work includes all work related activities.

4.1.2. Types of Work Activities Children Perform

Of those children for whom it is reported that they engage in some form of work activity be it their primary and/or secondary occupation, the activities have been grouped in to domestic work, farm work, herding and others and presented in table 3 below. To allow clear understanding of the phenomenon, the information is disaggregated by sex and age group.

It is observed from the same table that 11.8, 9.8 and 70.6% of boys aged 7-10 engage in domestic work, farm work and herding, respectively. Whereas, the corresponding percentages for girls in the same age category are 22.4, 6.1 and 51.1%. For the age category of 11-14, male children participation is more in farming (52.3%) and herding (29.5%) but less in domestic work (13.6%).

Whereas, female children are more likely to participate in domestic work (50%), followed by farming (14.6%) and herding (12.5%). If we see at the combined level, boys' participation is more in herding activities (51.6%), followed by farm work (29.5%) and domestic work (12.6%). Whereas, girls' participation is higher in domestic work (36.1%) followed by herding (32%) and farm work (10.3%).

In the study area, generally, there is high rate of child participation in herding activities (41.7%) followed by domestic work (24.5%) and farming activities (19.8%).

Table 3: Type of Work Activities Performed by Children by Age and Sex (%).

Main Activity	Age 7 – 10				Age 11 – 14				Age 7-14					
	M		F		M		F		M		F		T	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Domestic	06	11.8	11	22.4	06	13.6	24	50.0	12	12.6	35	36.1	47	24.5
Farm	05	09.8	03	06.1	23	52.3	07	14.6	28	29.5	10	10.3	38	19.8
Herding	36	70.6	25	51.1	13	29.5	06	12.5	49	51.6	31	32.0	80	41.7
Others*	04	07.8	10	20.4	02	04.6	11	22.9	06	06.3	21	21.6	27	14.0
Total	51	100	49	100	44	100	48	100	95	100	97	100	192	100

Source: Computed from own data survey result, 2014.

*Others: Informal activities like selling food, trading, manual work, etc.

4.1.3 Chi^2 Tests of Categorical Variables against Child Activities

Chi^2 Test for Child Characteristics: the sex of the child is expected to affect the likelihood of the child going to school or not. In rural households of Ethiopia, female children do have much more work burden domestically than their male counterparts witnessed by most of the domestic works like fetching water, cooking food, child care, cleaning etc., which are considered to be the responsibilities of female children.

Apart from the domestic responsibilities, female children are also required to work on a farm just like their male counterparts. It is important to consider the role of gender in the children's time allocation because subsistent households may be forced to chose which children should go to school, male or female. As can be seen from table 4 below, there is a strong relationship between child activities and child sex, with a P-value of 0.080.

One factor of children's likelihood of schooling and working is their biological relationship with the household head, who is assumed to make the child time use decision. It is expected that children who are the direct off-springs of the head would be more likely to attend school than the other children in the household. The head might be inclined towards the human capital development of his/her own child while those who are not his/her direct off-springs may be discriminated in favor of work jeopardizing their potential to attend school. As can be seen from table 4, there is a strong relationship between child activities and biological children with a P-value of 0.011.

Chi^2 Test for Household Attributes: as can be seen from the table below, there is a strong relationship between child activities and sex of the head of the household with a P-value of 0.015. Apart from sex, education level of the head is expected to have an important implication for child schooling- child work decision in line with the parental education hypothesis of Dessy (2000). Better education background of parents is likely to favor child schooling as the decision makers become more aware of the benefits of investing in human capital. Besides, it is logical to hypothesize that better educated head would be well informed about the detrimental impacts of child labor on the overall development of children.

However, it should be noted that uneducated poor parents tend to enroll their children because they have learnt from their lives that they are poor because they were not educated hence they do not want the fate of their children be as themselves. It is hypothesized that head education increases child schooling while decreasing child work. As can be seen from the table below, however there is no strong relationship between child activities and the education of the household head with a P-value of 0.33.

Chi^2 Test for Household Assets: household participation in labor sharing activities, receipt of remittance, engagement in off-farm and other income generating activities (business) would have interesting implications for child time allocation decision and hence have been included in the model. The expectation was that household involvement in off-farm and other income generating activities would relax the budget constraint of the household making them capable of paying for educating children. It is also likely that such activities would make children disadvantaged in terms of access to schooling, because the burden of domestic and on farm activities might be on children as adults go for income generating activities. In addition, those activities might require involvement of children themselves thereby reducing their probability of attending school. The evidence tells that dummy variables intended to capture the effect of off-farm and other income generating activities are insignificant in all equations both for the pooled and disaggregated data probably because the opposing effects that we expected offset each other.

Supplementary income in the form of remittance could have significant role in deciding whether to enroll a child. The expectation was that households who receive remittance would invest in child education and reduce child work. However, it is found that receipt of remittance decreases the likelihood of schooling and increases that of work both in the pooled model and that of girl's equation. Possible explanation for this can be that such families might use remittance income to buy livestock which is likely to increase work burden on children. In the case of boys, they are likely to attend school and combine school with work. As can be seen from the table below, there is a strong relationship between child activities and the household's engagement in business and labor sharing with a P-value of 0.021 and 0.045 respectively, whereas child activity has no strong relationship with the existence of a remittance as witnessed by a P-value of 0.39.

Table 4: Chi^2 Tests of Categorical Variables against Child Activities.

Variable		Chi^2	P- Value
Child Characteristics			
Child-Sex		6.6161	0.080
Bio-Child		8.64	0.011
Household Attributes			
Head-Sex		10.4159	0.015
Head-Lit		3.4297	0.330
Household Assets			
Off-farm		0.9548	0.812
Business		9.5693	0.021
Remit		3.0121	0.390
L.Sharing		7.8934	0.045

Source: Computed from own data survey result, 2014.

4.2. Econometric Results

The method of empirical analysis is Multinomial Logit using maximum likelihood estimation to estimate the parameters of the MNL equation. Before running the model, variables were assessed employing the gladder test in STATA to come up with the appropriate transformation of count variables. All count variables are found to have symmetric distribution at their level. Hence, they are used as they were.

Moreover, efforts have been made to detect whether the data set suffers from the problem of multicollinearity. The Variance Inflation Factor (VIF) test has been employed to check for the presence of severe multicollinearity problem among the explanatory variables included in the empirical model. Except for age and its squared value, the VIF test result showed that multicollinearity is not of a serious problem in the data set (see annex 2). The VIF value for the age variable was found to be less than 3 when the age squared variable is excluded. However, because there are supporting evidences that age would not have a linear effect in the Ethiopian context (Beliyou, 2003; Assefa, 2002) and due to the significant impact of this variable in the child work-school participation equation, the researcher found it important to keep the variable despite the higher VIF values. In addition, careful observation of the pair-wise correlation coefficients provided in annex 2 are all below 0.8 suggesting that the data set does not suffer from severe multicollinearity problem (Gujarati, 1995).

Another test of critical concern in the multinomial logit model is the Independence of Irrelevant Alternatives (IIA) assumption. Attempt has been made to test whether the assumption holds in this case employing Hausman test making use of mlogtest available in STATA (see annex 1).
The test result conforms to the null hypothesis that an outcome is independent of all other alternatives consistently for all probability sets because for all four categories, the calculated Chi^2 values are less than the corresponding tabulated values at the respective degrees of freedom with a strong P-value of 1.000. Hence, the IIA assumption holds in this context validating the use of MNL model.

Evidence from the descriptive statistics has shown that children perform a multitude of activities which may have implications for their ability to attend school. The probability of a child to go to school, to work or to engage in a combination of them tends to be a response of various child,

parental, household, school-related and community variables. The section that follows is devoted to the discussion of the econometric analysis of the impact of those variables on the child work-school participation decision.

Table 5: Summary of Estimated Coefficients of Each Categorical Activity.

Variable	Child Activity			
	School and Work		Work Only	
	Coef.	Std. Err.	Coef.	Std. Err.
Child-Age	.48530	(.040121)	.31234	(.016686)
Child-Age^2	-.32 83	(.01 8976)	.16567	(.077949)
Child-Sex	-.62761	(.027654)	-.13340	(.059267)
Bio-Child	.87022	(.01 2346)	-.15121	(.057637)
Head-Sex	-.57363	(.018 546)	.36373	(.056642)
Head-Age	-.00074	(.0 12347)	.13457	(.049782)
Head-Lit	.57892	(.01 9875)	-.78956	(.011416)
$Head_{1-6}$	.56345	(.011230)	-.00516	(.058030)
$Head_{7-12}$	.13345	(.015034)	-.04596	(.046413)
#HH-Size	.66136	(.043822)	-.53809	(.038691)
$\#Male_{15-65}$	.30625	(.012136)	-.63480	(.026373)
$\#Female_{15-65}$	.00846	(.024122)	-.33781	(.057277)
#Females	-.04681	(.013183)	-.01906	(.021341)
#Infants < 5	.46945	(.015162)	.88520	(.047633)
#Depratio	.07156	(.032295)	.02263	(.015853)
#Oze	-.33081	(.061927)	.40193	(.095179)
#Oxen	-.40436	(.051761)	-.23432	(.016475)
L.Size	.43472	(.020097)	.74207	(.070589)
#P.Lands	-.22272	(.015518)	.10661	(.045314)
Off-farm	.26755	(.011854)	-.55802	(.035377)
Business	-.26193	(.018986)	-.10054	(.012347)
L.Sharing	-.73651	(.016856)	.13228	(.014393)
Remit	-.62236	(.015778)	-.9756	(.040571)
Dis-Sch	-.22097	(.084741)	.35673	(.023412)
Sch-Exp	-.04071	(.045684)	.06745	(.012223)
Cons.	-1.9670	(.026204)	1.33764	(.033451)
Base Outcome (School Only)				

Source: Computed from own data survey result, 2014

Figures in parenthesis are standard errors.

*, **, and ***: Represent significance levels at 1%, 5% and 10% respectively.

As there are 3 categories in the alternative, there are 2 equations with the one serving as a base category, in this case, school only is labeled as a reference category and every coefficient interpretation takes this variable as a reference.

Where, β's being the raw regression coefficients from the output, and interpretation of the significant variables is presented as follows by referring table 5 above.

Child Age: a one unit increase in age results in an increase of the odds ratio of 0.49 and 0.31 for school and work to school only and working to school only with a p-value of 0.036 and 0.005 respectively showing high level of significance as were expected before. The age effect on the probability of going to school was raised to square to capture the possible non linear effects it may have and the result shows that for one unit increment in age, the odds ration of school and work to school only decreases by 0.33 which is also in line with the expectations with a p-value of 0.047.

Child Sex: it is expected that child sex affects the odds ration of school and work to school only and that of work only to school only, the effect being higher for boys i.e. boys are expected to have much more probability to go to school as compared to their female counterparts as the latter participation in school is culturally affected by the burden they have at domestic works. The econometric result shows that the odds ratio of school and work to school only is higher by about 0.63 for boys than girls which implied that boys are more likely to go to school while girls still participating at domestic work.

Biological Child: being the biological child of the parents does affect the likelihood of the child to go to school or parents do value their children as investments having a long term return. Thus it was expected as biological child has much more chance to go to school than those who are not. The econometrics result shows that the odds ratio effect of school and work to school only is found to be significant where as the odds ratio effect for that of work only to school only is found to be in favor of the biological child where the effect is negative 0.15 with 5% level of significance.

Household Head Sex: female headed households are expected to be more likely to send their children to school as compared to their male counterparts. Thus children headed by female are more likely to combine school with work and are less likely to participate at domestic work. The coefficient value of 0.36373 is positive implying odds ratio of work only to school only for children whose heads are female is higher by about 0.37 and is significant at 1%.

Head Education up to Grade Six: based on theory and empirical findings referred in this document, children who live with parents whose education level is up to grade 6 are more likely to go to school as compared to children who live with illiterate parents. The econometric result coincides with the expectation as witnessed by the odds ration of school and work to school only for children who live with their heads educated up to 6^{th} grade is 0.56 with a p-value of 0.324 though not significant. On the contrary, it is expected that children who live with parents educated up to grade 6 are less likely to be at work as compared to those who live with illiterate parents, i.e., the odds ratio of a child being at work only to being in school only is found to be -0.0052 with a p-value of 0.014, which is significant at 5%.

Household Head Education Higher than Grade Six: parents with higher level of education are more likely to send their children to school than make them participate at domestic work. Thus the expected sign for schooling is positive. The econometric result for work and school

0.13345. It is interpreted as the odds ratio of school with work to school only for children with their heads educated 7^{th} to 12^{th} grade is higher by 0.13345 with a p-value of 0.929, though not significant statistically.

Household Size: it has been expected that as the number of families in a given household rises, there will be more labor force in the family which demands children time only at the margin. The result shows a coefficient of -0.53 which is interpreted as a one unit increment in the number of family members results in the reduction of the odds ratio of work only to school only by about 0.53 which is significant at 1%.

Households with Infants under Five Years Old: it was expected that as the number of infants under 5 years old increases in a given family, the burden of the older children to care for the

infants also increases whereby positively strengthening their being at domestic work at the expense of their schooling. The econometric result shows a coefficient of 0.88 which is interpreted as one unit increment in the number of infants under 5 increases the odds ratio of working only to school only by about 0.88 which is significant at 1%.

Plots of Land: as the number of plots of land increases, it is expected that the fragmentation needs more time to move here and there among the different plots of land whereby demanding more time on the whole family and the children as well. The econometric result coincides with the expectation with a coefficient value of -0.22272 which is interpreted as a one unit increment in the number of plots of land results in the reduction in the odds ratio of school and work to school only by about 0.22 which is significant at 5%.

Labor Sharing Arrangements: when there is labor sharing in the family, it gives much freedom to children not to be at domestic work. Thus the result shows that the odds ratio of work only to school only for children whose parents practice labor sharing arrangements is higher by about 0.11, though not significant.

Availability of Remittance: it is expected that households who have additional income as remittance decreases their tendency to use much child labor. In the econometric result, it is found that the coefficient for this variable is -0.9756 which is interpreted as the existence of remittance to the family decreases the odds ratio of working to school only by about 0.98 which is significant at 10%.

Distance to School: in rural Ethiopia as the only means to go to school is on foot, the distance to school was expected to affect the likelihood of children to be at school negatively. The farther the school, the less likely children are going. The result is in line with the expectation with a coefficient value of -0.22097 which is interpreted as a one minute increment in distance to school results in the reduction of the odds ratio of school and work to school only by about 0.22 which is significant at 1%. On the contrary, the odds ratio of working to work only 0.35673 means a one minute increment in distance raise it by about 0.356 with a p-value of 0.000 which is significant at 1%.

4.2.1. Impacts of Child Characteristics

The literature identifies that child specific characteristics might have important implications for the allocation of child time across different activities; school only, school and work, and work only. Among the attributes of children; age, sex and biological relationship with the household head is expected to have pronounced effects on the likelihood of child work and schooling. The direction of their effects on child schooling/ work are determined by socio-cultural factors.

It is important to consider the role of gender in the children's time allocation because subsistent households may be forced to chose which children should go to school, male or female, whose time allocation will also be determined by his/her age. In a relatively poorer family, older children may be needed to supplement household income by participating in paid employment restricting their access to school as compared to younger siblings in the household owing to their relative working capacity.

Whereas in rural economies where paid employment is almost non-existent and when the work definition encompasses household chores, unpaid family business and farm work apart from wage employment, older children may be allowed to at least combine work and school since younger siblings may overtake the herding and home chore activities. In the Ethiopian context where late enrollment is common, we would expect that the probability of schooling would rise as children age at the primary level. The relationship between child outcome and age may not be linear. Hence, the square of child age has been incorporated to capture the non-linear effect. The marginal effects of the variables on the probability of all children work - school participation are presented here in table 6 below.

Another potential factor of children's likelihood of schooling and working is their biological relationship with the household head, who is assumed to make the child time use decision. It is expected that children who are the direct off-springs of the head would be more likely to attend school than the other children in the household. The head might be inclined towards the human capital development of his/her own child while those who are not his/her direct off-springs may be discriminated in favor of work jeopardizing their potential to attend school.

The result shows that age has significant effect on child participation in work and school (similar to Tassew *et. el*, 2005). It increases the likelihood of school attendance and combining school

with work while it decreases the probability of specializing in work only with a greater impact on schooling. The square of age has the opposite impact implying that children are more likely to combine work with school if not attend school only as they age but at a decreasing rate.

The dummy variable for sex of the child is found to be significant in the schooling and school-work combination equations. This necessitates running disaggregated regression for each sex. Accordingly, the marginal effects of variables from the disaggregated models for girls and boys have been included in table 6 below.

Being the direct off-spring of the household head is found to increase the children chance to combine school with work and decrease the probability to specialize in work related activities which implies that other children in the household are disadvantaged for they lack access to formal schooling.

Table 6: Marginal Effects on the Probabilities of Work- School Attendance Outcomes for Child Characteristics

Variable	Work and School		Work Only	
	Marginal effect (Std. Err.)		Marginal effect (Std. Err.)	
	For All Children Combined			
Child-Age	0.12421**	(0.0574)	-0.21204*	(0.0456)
Child-Age2	-0.00561**	(0.0012)	0.01211*	(0.0032)
Child-Sex	0.35627*	(0.0222)	0.03232	(0.0233)
Bio-Child	0.07075**	(0.0314)	-0.08172**	(0.0330)
For Girls				
Child-Age	-0.00418	(0.0304)	-0.30992*	(0.0688)
Child-Age2	-0.00805	(0.0023)	0.01306*	(0.0021)
Bio-Child	0.00674	(0.0289)	0.00996	(0.0413)
For Boys				
Child-Age	0.41885*	(0.0006)	-0.31260*	(0.0093)
Child-Age2	-0.01266*	(0.0034)	0.01504*	(0.0036)
Bio-Child	0.15067*	(0.0575)	-0.16415*	(0.0031)

Source: Computed from own data survey result, 2014.
Figures in parenthesis are standard errors.
*, **, and ***: Represent significance levels at 1%, 5% and 10% respectively.

4.2.2. Household Attributes and Child Work-School Participation

Household attributes specific to the head and variables of household composition would have important implications for child time allocation decision. The variables included are sex, age and education level of the head, size of the household, the number of females, number of infants less than 5 years old, number of females and males above the age of 15 and below 65 and dependency ratio defined as the ratio of infants (below 5 years) and elderly (above the age of 65 years) to the total number of household members.

Female headed households in highlands are likely to be discriminated against in the provision of assets mainly land which is the most important asset for survival restricting their earning potential (Assefa, 2002). This has an implication that since children have less to do on farm they may have sufficient time for school. However, those households may be economically insecure so that children are needed to supplement family income. Female headed households need their male members to undertake farming which is traditionally the role assumed to males. On the other way, some argue that female heads are often inclined towards boys and will give priority to male children to send school. In such households older female children would be more likely to assume domestic responsibilities and be out of school. The result shows that children in male headed households are more likely to engage in work only with a marginally significant effect on boys.

Age of household head may be essential determinant of child work-school outcome. As head gets older children may be more likely at least to combine school with work if not specialize in work only owing to greater demand for labor to complement and/or substitute head's labor. Seen from other perspective, parents may learn from life that investing in education is essential for future employment prospect of children and hence favor child schooling.

Apart from sex and age, education level of the head is expected to have an important implication for child schooling- child work decision in line with the parental education hypothesis of Dessy (2000). Better education background of parents is likely to favor child schooling as the decision makers become more aware of the benefits of investing in human capital. Besides, it is logical to hypothesize that better educated head would be well informed about the detrimental impacts of

child labor on the overall development of children. However, it should be noted that uneducated poor parents tend to enroll their children because they have learnt from their lives that they are poor because they were not educated hence they do not want the fate of their children be as themselves. It is hypothesized that head education increases child schooling while decreasing child work.

To capture this possible impact three dummy variables have been introduced to the empirical analyses; dummy for whether the head is literate, dummy for head having formal schooling of up to grade six and dummy for head's schooling level above grade seven. Literacy of household head is found to be significant in none of the equations however. As far as the level of schooling is concerned, heads with formal schooling favor child schooling and reduce child work as compared to others (similar results in this case are reported by Assefa and Arjun, 2003; Tassew *et al*, 2005). As shown in table 7 below, Children in households with formal schooling level of up to grade six are more likely to combine school with work and less likely to specialize in work by 8% each. Whereas, those in households having formal schooling level of above grade seven have a greater probability of combining school with work (11%) and reduced probability of specializing in work only (11%) than others. At the gender disaggregated level, schooling level of household head has significant influence in reducing the probability that boys would specialize in work only.

The presence of adult males and females in the household is thought to liberate younger children from specializing in work only thereby increasing their potential to attend school. The presence of one more adult male or female is found to increase the chance of a girl to combine school with work by 2%, while the chance for a boy increases by 1% in each. The addition of one more male adult heightens the probability of a girl specializing in work only by 11%. It is expected, because the socio-cultural environment of the rural community is that females are responsible to feed and assist male members implying that one more male adult is an addition to the burden females are expected to bear.

The presence of infants and higher dependency ratio are likely to discourage child schooling as they are required to care for infants and the elderly. An addition to the number of infants is found to increase the likelihood of children to involve in work only by 5.2%. At the disaggregated

level, girls are more likely to specialize in work only by about 10%, while it has no significant effect in the case of boys.

Another important variable of household composition is household size. Larger households may have sufficient labor input so that children may be likely to enroll in school. Households grow in number adding on children implying that the number of younger children may be disproportionately higher. Larger households may have little income in per capita terms which limits their ability to afford for children's schooling. There is evidence that larger size of household reduces the likelihood of a child to participate in work only. For the pooled model, one more household size leads to a 2.6% fall in the probability of a child only working with a marginally higher effect for girls (4.2%). The findings that more infants reduce child education while large household size and dependency ratio have the opposite effect imply that more numbers of elderly and large household members are assets than are demanders of child labor (Nielson and Dubey, 2002). It is common for the elderly to keep home and infants even when they are not able to work on farm and other domestic tasks partly reducing children's responsibility to care for siblings at home and there by releasing time for schooling.

Table 7: Marginal Effects on the Probabilities of Work- School Attendance Outcomes for Household Attributes

Variable	School and Work		Work Only	
	Marginal effect (Std. Err.)		Marginal effect (Std. Err.)	
	For All Children Combined			
Head-Age	0.00054	(0.0021)	-0.00056	(0.0021)
Head-Sex	-0.04391	(0.0390)	0.04151*	(0.0208)
Head-Lit	-0.00281	(0.0371)	-0.00387	(0.0421)
$Head_{1-6}$	0.08170	(0.0390)	-0.08012**	(0.0352)
$Head_{7-12}$	0.01121	(0.0273)	-0.10957*	(0.0381)
#HH-Size	0.00978	(0.0118)	-0.02575*	(0.0118)
$\#Male_{15-65}$	0.00768	(0.0176)	0.00838	(0.0162)
$\#Female_{15-65}$	0.01331	(0.0179)	0.00558	(0.0114)
#Females	0.00941	(0.0139)	-0.00361	(0.0157)
#Infants<5	-0.01542	(0.0287)	0.05240**	(0.0258)
Depratio	0.02588	(0.1419)	-0.13077	(0.1324)
For Girls				
Head-Age	-0.02739	(0.0315)	0.00134	(0.0061)
Head-Sex	-0.01305	(0.0357)	0.05010	(0.0384)
Head-Lit	-0.03882	(0.0371)	-0.01910	(0.0469)
$Head_{1-6}$	0.04179	(0.0652)	-0.01087	0.0459)
$Head_{7-12}$	-0.03739	(0.0345)	-0.03178	(0.0521)
#HH-Size	-0.01208	(0.0148)	-0.04196*	(0.0137)
$\#Male_{15-65}$	0.02044	(0.0151)	0.01108*	(0.0251)
$\#Female_{15-65}$	0.02107*	(0.0178)	0.01902	(0.0209)
#Females	0.00295	(0.0156)	0.01587	(0.0176)
#Infants<5	0.01098	(0.0283)	0.09848*	(0.0309)
Depratio	0.03547	(0.1438)	-0.42792**	(0.1129)
For Boys				
Head-Age	-0.05186**	(0.0464)	-0.00626	(0.0064)
Head-Sex	0.02543	(0.0515)	0.13498*	(0.0339)
Head-Lit	0.01021	(0.0516)	-0.01014	(0.0516)
$Head_{1-6}$	-0.00691	(0.0727)	-0.11308*	(0.0439)
$Head_{7-12}$	-0.09261**	(0.0464)	-0.16143*	(0.0383)
#HH-Size	0.02044	(0.0164)	-0.01315	(0.0188)
$\#Male_{15-65}$	0.01090	(0.0203)	-0.02914	(0.0226)
$\#Female_{15-65}$	0.01357	(0.0253)	0.00476	(0.0238)
#Females	0.02004	(0.0137)	-0.02027	(0.0176)
#Infants<5	-0.05591	(0.0066)	0.03456	(0.0358)
Depratio	0.04612	(0.2341)	0.00322	(0.2003)

Source: Computed from own data survey result, 2014.

Figures in parenthesis are standard errors.

*, **, and ***: Represent significance levels at 1%, 5% and 10% respectively.

4.2.3 The Role of Household Assets

As child time allocation decision is assumed to be a rational response to maximize household utility subject to full income constraint assessment of the role of household assets is indispensable to the child labor-schooling analysis. Many argue that poverty is the driving force behind the engagement of millions of children at their early age in work in a way that endangers their overall development and hence hinders their access to schooling. In non-monetized rural economies, household assets become the potential indicators of household wealth. Variables thought to measure the household asset position have been included in this study. The most important ones are land size, number of plots of land owned and number of livestock.

Overall, larger land size discourages specialization in work only but encourages combination of school with work. This supports the proposition that larger land size demands more labor including children while at the same time increases the earning potential of the household enabling to afford for schooling. The direction of relationship holds for the male boys whereas it is the opposite for the female category. Besides its size, the number of plots of land a household owns would have important implication for the demand for labor and hence child school-work outcome. Household ownership increases the probability that a child combines school with work by 1% (See in table 8 below).

Livestock is another essential asset for the rural people. It is likely that more livestock demands more children to herd. On the other hand, ownership of more livestock capacitates the household to pay for school in addition to reducing the need for children to engage in income generating activities which may hinder their schooling potential. It is evident that the vast majority of the rural community employs ox-plow system of agriculture. Hence it is found important to see the impact of the number of oxen a household owns and other livestock. The number of oxen owned by a household is found to be significant in none of the equations. Broadly, the result reveals that the more number of oxen owned, the less likely a child is to combine school with work and work only. As far as the effect of other livestock is concerned, it has been found to be significant in explaining boys' time allocation. For a unit increase in the number of livestock that the household owns the probability of a male child to combine school with work by1%. A unit increase in the number of livestock tends to increase a boy's likelihood of combining school with work and work only by about 1% and 0.3%, respectively.

Apart from the physical assets discussed above, household participation in labor sharing activities, receipt of remittance, engagement in off-farm and other income generating activities (business) would have interesting implications for child time allocation decision and hence have been included in the model. The expectation was that household involvement in off-farm and other income generating activities would relax the budget constraint of the household making them capable of paying for educating children. It is also likely that such activities would make children disadvantaged in terms of access to schooling because the burden of domestic and on farm activities might be on children as adults go for income generating activities. In addition, those activities might require involvement of children themselves thereby reducing their probability of attending school. The evidence tells us that dummy variables intended to capture the effect of off-farm and other income generating activities are insignificant in all the equations both for the pooled and disaggregated data probably because the opposing effects that we expected offset each other.

Supplementary income in the form of remittance could have significant role in deciding whether to enroll a child. It is expected that households who receive remittance would invest in child education and reduce child work. It is found that receipt of remittance increases the likelihood of work only both in the pooled model and that of girl's equation. Possible explanation for this can be that such families might use remittance income to buy livestock which is likely to increase work burden on children. In the case of boys, they are likely to combine school with work. Female children are likely to participate in work only by 7% if they belong to a household that receive remittance. The result reveals that parents use their additional income in the form of remittance disproportionately for the education of boys at the expense of girls. Rural communities may not see investment in child education as such attractive for they may think that they will have secured old age support if their children migrate to some other place or country and follow suit the role of current remitters rather than wasting time in school.

In agricultural communities who are constrained by income to hire labor and where the labor market is malfunctioning, if it exists, households pool their labor input i.e., engage in traditional labor sharing arrangements to satisfy their labor demand for different activities on the farm. This arrangement would have tremendous impact on the child schooling-work decision. Parents may

decide to educate their children as labor demand could be satisfied through the sharing arrangements. From another perspective, children would be pulled away from school at peak times to discharge the responsibility of the sharing arrangement even if they were enrolled indicating that this may reduce schooling and increase work. Participation in labor sharing activities increases the probability of a child combining work with school (3%) and reduces the likelihood of specializing in work only (6%). Evidence from the disaggregated data tells us that the increment on the probability of combining the two activities is larger for boys (6%) than girls (4.2%) (See table 8 below).

Table 8: Marginal Effects on the Probabilities of Work- School Attendance Outcomes for Household Assets

Variables	School and Work		Work Only	
	Marginal effect (Std. Err.)		Marginal effect (Std. Err.)	
	For All Children Combined			
#P.Lands	0.01041**	(0.0051)	0.00031	(0.0033)
L.Size	0.00112	(0.0001)	-0.00089	(0.0024)
#Oxen	-0.00933	(0.0120)	-0.00257	(0.0202)
#Oze	0.00054	(0.0003)	-0.00012	(0.0037)
Off-farm	-0.00230	(0.0268)	0.01008	(0.0262)
Business	0.01161	(0.0233)	-0.02014	(0.0462)
Remit	-0.0416***	(0.0251)	0.09754***	(0.0219)
L.Sharing	0.03182**	(0.0401)	-0.05711**	(0.0791)
For Girls				
L.Size	-0.00616*	(0.0016)	0.00128*	(0.0005)
#P.Lands	0.01095*	(0.0096)	-0.01041	(0.0051)
#Oxen	-0.00052	(0.0254)	0.00635	(0.0177)
#Oze	-0.00866	(0.0077)	0.00065	(0.0002)
Off-farm	-0.02405	(0.0375)	0.03009	(0.0083)
Business	0.02403	(0.0287)	-0.02327	(0.0313)
Remit	-0.02019	(0.0232)	0.07221**	(0.0348)
L.Sharing	0.04204	(0.0281)	-0.06079***	(0.0351)
For Boys				
L.Size	0.00077	(0.0002)	-0.00704	(0.0021)
#P.Lands	0.01110	(0.0031)	-0.00137	(0.0078)
#Oxen	-0.00325	(0.0154)	-0.00945	(0.0404)
#Oze	0.01029*	(0.0037)	0.00306**	(0.0085)
Off-farm	0.02644	(0.0354)	0.00503	(0.0391)
Business	0.01041	(0.0309)	-0.01251	(0.0331)
Remit	-0.01976	(0.0374)	0.01603	(0.0337)
L.Sharing	0.06378	(0.0421)	-0.02616	(0.0335)

Source: Computed from own data survey result, 2014.

Figures in parenthesis are standard errors.

*, **, and ***: Represent significance levels at 1%, 5% and 10% respectively.

4.2.4. School Related Factors

Child schooling is not only a demand side phenomenon exclusively determined by the choice and ability of parents to send their children to school. Rather, a host of supply side factors play a role in determining children's chance of going to school. A child may not be in school for a multitude of reasons: because he/she chooses so, he/she does not have somebody to care for, the household is not able to afford for schooling, he/she is badly needed by family to work, there exist no school in a reasonable distance, the school facilities are too poor, or parents think that schooling is not appropriate for the child. Parental perception about the importance of schooling may be influenced by their background, the situation in the community, the relevance of education for household and farm work, employment prospects in the labor market and the socio-cultural environment. As a measure of supply-side school factors two variables have been incorporated in the model; distance to the closest government primary school in minutes and household average school expenditure per enrolled child.

Distance to school is expected to hinder the schooling while promoting child labor in rural areas where means of transport other than foot is non-existent. This may be due to security reasons especially for girls. In societies where abduction is common, parents want to keep an eye on their children implying that the farther the school, the less likely children are to attend school. Besides, farther school requires longer time for children to go to school reducing available time for work and increasing the opportunity cost of schooling. It is found that for each additional minute distance in primary school, children's probability of combining work with school, and specializing in work only increase and decrease by 3% and 2%, respectively(See in table 9 below). This direction of influence applies for the male and female category except that the increment in the boys' probability of combining work and school is larger (5%) while distance to school is not found to be significant in all equations for girls.

The result for girls is disputable in the case of rural Ethiopia where harmful cultural practices like rape and abduction are prevalent that implies distance to school should significantly affect the decision to enroll a girl child than the male one for security reasons. It may probably be that female children could perform their domestic tasks even during night reducing the impact of farther school and hence longer hours in the day to go to school. Whereas the natures of activities male children are traditionally assigned such as herding and on farm activities are not suitable to accomplish during the night time.

Expenditure on school would have important impact on the likelihood of child schooling. In situations where school expenditure is higher parents may not be able to afford for child schooling even if they do not need their children to work. In the rural Ethiopian context where the available schools are government schools, there are no tuition fees. However, parents are expected to pay for learning materials and uniforms. The results show that average expenditure per enrolled child is significant in the wok equation for girls with 0.07% reduction in the probability of engaging in work only. We observe that a rise in average school expenditure of a household increases the probability of a child's school attendance and combination of school with work while reducing the probability of specializing in work.

Table 9: Marginal Effects on the Probabilities of Work- School Attendance Outcomes for School Related Factors

Variables	School and Work		Work Only	
	Marginal effect (Std. Err.)		Marginal effect (Std. Err.)	
	For all Children Combined			
Sch-Exp	0.00011	(0.0018)	-0.00045	(0.0012)
Dis-Sch	0.03075*	(0.0063)	-0.01906*	(0.0048)
For Girls				
Sch-Exp	0.00581	(0.0013)	-0.00707***	(0.0053)
Dis-Sch	0.01058	(0.0094)	-0.00912	(0.0041)
For Boys				
Sch-Exp	0.00051	(0.0002)	-0.00916	(0.0026)
Dis-Sch	0.05032*	(0.0122)	-0.02331*	(0.0023)

Source: Computed from own data survey result, 2014.
Figures in parenthesis are standard errors.
*, **, and *** represent significance levels at 1%, 5% and 10% respectively.

Chapter Five: Conclusions and Policy Implications

The issue of child labor has become a global concern and hence critical in the development economics literature. Wide spread arguments continue as to what it constitutes and how to tackle it so as to see a better tomorrow. Despite growing concern about the detrimental effects of child labor by international and national institutions related to labor and child right, the chance of the vast majority of children in the invisible and informal sector has not been empirically investigated to the extent that the seriousness of the issue demands. Work related activities such as working on the family farm and domestic chores which are often excluded from child labor definition could have implications for the overall developments of children. Compared to the reference group of non-working children, the educational achievements of those undertaking the various forms of activities would be impaired as work and schooling compete for time (Assefa, 2002).

Several evidences reveal that the incidence of child labor is higher in Sub-Saharan African countries than any other part of the world. However, empirical studies in this region are far from sufficient; even the available ones are drawn from case studies. Ethiopia being one of such countries encounters rampant problem of child labor. The proportion of children in the national labor force is estimated to be over 40%. The issue is of critical concern in the sense that working children lack the opportunity to formal schooling than the non-working ones as evidenced by the lowest rate of schooling. The problem is pronounced in the rural parts of the country. Even though labor market does not exist in rural Ethiopia, child unpaid family work usually for longer hours is prevalent. Drawing primary and secondary data from rural Tigray (evidence from Hintalo-Wejerat woreda) and adopting a broader definition of child labor that includes all work related activities that children engage in is adopted and employing MNL approach, this study has attempted to assess the major socio-economic factors affecting child labor and schooling.

The results show that children participate in domestic and farm activities which are potentially detrimental to their educational development since considerable number of primary school age children are out of school. This study shows that child and household characteristics play significant roles in determining child school-work outcome. Similar to the findings by Assefa (2002), it has been observed from the result that the marginal effects of many variables on school attendance and work outcomes are opposite in the direction of influence and of comparable size.

This finding suggests that well planned and research based economic and social policies with the purpose of combating the problem of child labor will have double outcomes by promoting schooling.

5.1 Conclusions

The major conclusions that emanate from the study are the followings:

- Biological relation to household head has important effect on the likelihood of school and work. Foster (non-biological) children are the most disadvantaged groups as they have very limited chance of schooling while at the same time bear the disproportionate burden of work.
- Number of infants in the household significantly reduces the probability of schooling with the larger effect on female children who are traditionally supposed to care for infants.
- Household physical assets have significant gender differential effects. Large land size increases the probability of girls' specialization in either activity with the greater impact on schooling. Whereas, ownership of livestock increases boys' probability of participating in work only due to the fact that herding is customary activity for male children.
- Lack of access to school in a reasonable distance hinders school attendance. In rural areas where modern transportation to go to school is missing and where child time is highly demanded for work, unreserved efforts need to be made to ensure availability of schools within the reach of those children to reduce the opportunity cost of schooling thereby promoting its utilization.

5.2 Policy Implications

On the basis of the major findings of the study the following policy implications have been forwarded.

- Building more schools within a reasonable distance to ensure easy access by rural children backed by adult education can have unquestionable positive effect in increasing school attendance.

- It has been clearly observed from the result that the presence of many infants hinders school attendance and induces exclusive engagement in work, especially for girls. Family planning efforts should be made with continuous monitoring about program performance.

- It has been found that education level of the household head has an interesting implication for the child time allocation decision. Adult training through formal and informal means can be a potential area to focus on to mitigate child labor and build human capital via investment in education of children.

- Policies and strategies with the aim to tackle child labor and foster education should have gender dimension. Such mechanisms should also take in to consideration regional circumstances since the economic and socio-cultural environment in each region demands means particular to the existing scenario.

- Overall, the long lasting solution to curb the problem of child labor and promote human capital accumulation is to get rid of poverty.

REFERENCES

Ahmad, Ayaz. (2012). Poverty, Education and Child Labor in Aligarh City-India. Stud Home Com Sci. pp. 165-172.

Akarro, R. R. J. and N. A. Mtweve. (2011). "Poverty and its association with child labor in Njombe District in Tanzania: The case of Igima Ward." Curr. Res. J. Soc. Sci 3(3): 199- 206.

Amin, S., M.S. Quayes and J.M. Rives. (2004). "Poverty and Other Determinants of Child Labor in Bangladesh," *Southern Economic Journal,* June 70(4): pp. 876-892.

Andvig, J.C. (2001). Family-Controlled Child Labor in Sub-Saharan Africa – A Survey of Research. Social Protection Discussion Paper No. 0122. The World Bank, Washington, D.C.

Aqil, Zahid. (2012). Nexus between Poverty & Child Labor: Measuring the Impact of Poverty Alleviation on Child Labor". Good Thinkers Organization for Human Development, Kasur. Addis Ababa.

Arjun, B and Assefa, A. (2009). Attending School, Two "RS" and Child Work in Rural Ethiopia, in the World of Child Labor: An Historical and Regional Survey, edited by Hugh D. Hindman, M.E. Sharpe, New York. pp. 265-267.

Assefa, A. (2001). Allocation of Children's Time Endowment between Schooling and Work in Rural Ethiopia. University of Bonn, ZEF. Discussion Paper No. 44.

Assefa, A. (2002). Allocation of Children's Time Endowment Between Schooling and Work in Rural Ethiopia, ZEF Discussion Paper on Development Policy no. 44. Bonn.

Assefa, A. and B, Arjun. (2005). Attending School, Two "Rs" and child work in Rural Ethiopia, in Alemayeyu Seyoum et al (eds) Proceedings of the Second International Conference on The Ethiopian Economy, Ethiopian Economic Association, Addis Ababa.

Baker, Judy L. (2008). "Urban Poverty: A Global Overview." World Bank, Washington D.C. January, 2008.

Baland, J. and A. Robinson. (2000). Is Child Labor Inefficient? *Journal of Political Economy,* 108(4): 633-679.

Bass, L. E. (2004). Child Labor in Sub-Saharan Africa. Lynne: Rienner Publisher.

Basu, K. (1999). The Economics and Law of Sexual Harassment in the work place. *Journal of Economic Perspective,* 17(3), pp. 141-157.

Basu, Kaushik, and Pham Hoang Van. (1998). "The Economics of Child Labor," *American Economic Review,* June 88(3): pp. 412-27.

Basu, K., Das, S. & Dutta, B. (2010). Child labor and household wealth: Theory and empirical evidence of an inverted-U. *Journal of Development Economics,* 91**,** 8-14.

Beliyou, A. (2003). Child Domestic Work in Ethiopia: An Empirical investigation. MSc Thesis, Addis Ababa University, school of Graduate Studies, Addis Ababa.

Bhalotra, Sonia and Christopher Heady. (2003). "Child Farm Labor: The Wealth Paradox," World Bank Economic Review, 17(2): pp. 197-227.

Bhalotra, Sonia and Zafiris Tzannatos. (2003). "Child Labor: What Have We Learnt?" The World Bank Human Development Network. Social Protection Discussion Paper0317,September.

Bhat BA and Rather TA. (2009). Child labor in the handicrafts home industry in Kashmir: A sociological study, Int NGO J,4 (9). 391- 400.

Bhat, Bilal Ahmad. (2010).Gender, education and child labor: A sociological perspective, Centre of Central Asian Studies, University of Kashmir, J and K, India, 190006 :June,: Vol. 5 (6): pages-323-328.

Bhat, Bilal Ahmad. (2011). Child Labor in the Cotton Industry of Uzbekistan: a sociological study. Centre of Central Asian Studies, University of Kashmir. Vol. 54.2011, 1, pages. 84-99 Discussion Paper 0317, September.

Bishai, David, El Daw Suliman, Heena Brahmbhatt, Fred Wabwire-Mangen, Godfrey Kigozi, Nelson Sewankambo, David Serwadda, Maria Wawe, and Ron Gray. (2003). "Does Biological Relatedness Affect Survival?" *Demographic Research*, May 8(9): pp. 261-278.

Blunch, Niels-Hugo and Dorte Verner. (2001). "Revisiting the Link between Poverty and Child Labor: The Ghanaian Experience," Centre for Labor Market and Social Research. Working Paper 01-03, April.

Bourguignon, F., F. Ferreira and P. Leite. (2002). "Ex-ante Evaluation of Conditional Cash Transfer Programs: the Case of Bolsa Escola," The World Bank. Policy Research Working Paper Series 2916.

Boyden, Jo, Birgitta Ling and Myers, William. (1998). What Works for Working Children Smedjebacken: UNICEF and Save the Children Sweden.

.

Canagarajah, S. and H.S. Nielsen. (2001). Child Labor in Africa: A Comparative Study, *Annals of the American Academy of Political and Social Science* May 575, pp. 71-91.

Cardoso, Eliana and Andrea Souza. (2004). "The Impact of Cash Transfers on Child Labor and School Attendance in Brazil," Vanderbilt University, Working Papers 0407, April.

Cartwright, K. (1999). Child Labor in Columbia. In *The Policy Analysis of Child Labor: A Comparative Study,* ed. C. Grootaert and H.A. Patrinos, 63-102. New York: St. Martin's Press.

Cartwright, K. and H.A. Patrinos. (1999). Child Labor in Urban Bolivia. In *The Policy Analysis of Child Labor: A Comparative Study,* ed. C. Grootaert and H.A. Patrinos, 103-130. New York: St. Martin's Press.

Carvalho, Irineu. (2000). "Household Income as a Determinant of Child Labor and School Enrolment in Brazil: Evidence from a Social Security Reform," PhD diss. Massachusetts Institute of Technology.

Case, Anne, Christina Paxson, Joseph Ableidinger. (2004). "Orphans in Africa: Parental Death, Poverty, and School Enrollment," Demography, August 41(3): pp. 483-508.

Cigno, A and F.C. Rosati. (2000). Why do Indian Children Work and is it Bad for Them? IZA Discussion Paper No. 115, Bonn, Germany.

Cockburn, J. (2000). Child Labor Versus Education: Poverty Constraints or income Opportunities? Paper Presented at a Conference on Opportunities in Africa: Micro Evidence on Firms and Households April, Oxford.

Cockburn, J. (2001). Child Labor versus Education: Poverty Constraints or Income Opportunities? Nuffield College Oxford University and Center for the Study of African Economies and CREFA.

Crammer, J.S. (1991). The Logit Model for Economists: London and New York: Edward Arnold.

CSA. (2006). Report on the 2005 National Labor Force Survey, Statistical Bulletin, 365.

Das, Saswati. (2012). Incidence of Child Labor and Child Schooling in India: Pattern and Determinants, ISRN Economics, vol. 2012.

Dayioglu, Meltem. (2006). "The Impact of Household Income on Child Labor in Urban Turkey," Journal of Development Studies, August 42(6): pp. 939-56.

Deb, Partha, and Furio Camillo Rosati. (2004). "Determinants of Child Labor and School Attendance: The Role of Household Unobservables," ILO, World Bank, and UNICEF. Understanding Children's Work Working Paper, April.

Dessy, S. (2000). A Defense of Compulsive Measures against Child Labor; *Journal of Development Economics,* Vol. 62, pp. 261-275.

Drusilla, K. (2001). Child Labor in Latin America: Policy and Evidence. Working Paper, Department of Economics, Tufts University.

Duflo, E. (2003).Grandmothers and Granddaughters: Old-Age Pensions and Intra-household *Allocation in South Africa, World Bank Economic Review,* 17(1): pp. 1-25.

Dumas, C. (2007). Why Do Parents Make Their Children Work? A Test of the Poverty Hypothesis in Burkina Faso*, Oxford Economic Papers-New Series,* April 59(2): pp. 301-329.

Edmonds, E. (2001). Will Child Labor Decline with Improvements in Living Standards? Dartmouth College Mimeo.

Edmonds, Eric V. (2005). "Does Child Labor Decline with Improving Economic Status?" Journal of Human Resources, Winter 40 (1): pp. 77-99.

Edmonds, E. (2006). "Child labor and schooling responses to anticipated income in South Africa," *Journal of Development Economics* 81: 386-414.

Edmonds, E. (2007). Child labor. Working Paper 12926. Cambridge, MA: National Bureau of Economic Research.

Edmonds, E. and N. Pavcnik. (2005). "Child labor in the global economy", Journal of Economic Perspectives 19: 199-220.

Ekpenyong, Stephen Nkereuwuem& Sibirii, Asain E. (2011). Street Trading and Child Labor in Yenegoa. International Journal of Scientific Research in Education, Vol. 4(1), 36-46.

Emerson, Patrick M. and Andre Souza. (2008). "Birth Order, Child Labor, and School Attendance in Brazil," *World Development*, September 36(9): pp. 1647-64.

Ersado, L. (2005). Child Labor and Schooling Decisions in Urban and Rural Areas: Comparative Evidence from Nepal, Peru, and Zimbabwe, *World Development*, March 33(3): pp. 455-480.

FDRE. (1995). Federal Democratic Republic of Ethiopia Constitution. Addis Ababa. Getinet and Beliyou (2007): Child Labor and Schooling in rural Ethiopia: Is there a trade-off? *Journal of Economic Literature.*

Gujarati, D. (1995). Basic Econometrics, 3rd ed. McGraw- Hill, Inc., Singapore.

Hazan, M and Berdugo, B. (2002): Child Labor, Fertility, and Economic Growth, *The Economic Journal*, Vol. 112, issue 482, pp. 810-28.

Huebler, F. (2008). Child labor and school attendance: Evidence from MICS and DHS surveys. *In:* PRACTICE, D. O. P. A. (ed.) UNICEF.

Ilahi, N. (2001). Children's Work and Schooling: Does Gender Matter? Evidence from the Peru LSMS Panel Data," The World Bank. Policy Research Working Paper No. 2745, December.

ILO. (1973). Minimum Age Convention No.138.ILO: Geneva.

ILO. (1998).Targeting the Intolerable Child Labor: International Labor Conference, 86th Session1998:ReportVoI.1, ILO, Geneva.

ILO. (1999). Worst Forms of Child Labor Convention No.182. ILO: Geneva.

ILO. (2002). *Every Child Counts: New Global Estimates on Child Labor*, Geneva.

ILO. (2004). *IPEC: Investing in every child: An economic study of the costs and benefits of eliminating child labor*, Geneva.

ILO. (2006a).The End of Child Labor: Within reach, Global Report under the Follow-up to the

ILO Declaration on Fundamental Principles and Rights at Work 2006, International Labor Conference 95th Session, Report I B, Geneva.

ILO. (2006b). Education as an intervention strategy to eliminate and prevent child labor: Consolidated good Practices of the International Program meme on the Elimination of Child Labor IPEC, ILO.

ILO (2013). World Report on Child Labor Economic vulnerability, social protection and the fight against child labor. Geneva.

Jensen, P. and Nielson, H. S. (1997). Child Labor or School Attendance? Evidence from Zambia, Center for Labor Market and Social Research, Denmark.

Khanam, R. and Rahman, M. M. (2007). Child work and schooling in Bangladesh: the role of birth-order, *Journal of Biosocial Science*, vol. 39, part 5, 641 - 656. September.

Khanam, R. and Rahman M.M. (2008). Child labor in developing countries: the role of education, Poverty and birth Order, *Journal of Social and Economic Development*, July-December, 173-95.

Khan, Rana Ejaz Ali. (2001). Socioeconomic Aspects of Child Labor: A Case Study of Children in Auto Workshops. The Lahore Journal of Economics No. 6, No.1.

Khan, Rena Ejaz Ali. (2003). The Determinants of Child Labor: A Case Study of Pakistan and Faislabad (Pakistan), *A PhD thesis*, Department of Economics, Bahauddin Zakariya University, Multan.

Kifle, M.; Mbarika, V.; and Datta, P. (2005). Report on the rapid Assessment Study on Child Labor in Selected Coffee and Tea Plantations in Ethiopia, Ethiopian Employers' Federation, Addis Ababa.

Kruger, Diana I. (2007). "Coffee Production Effects on Child Labor and Schooling in Rural Brazil," Journal of Development Economics, March 82(2): pp. 448-63.

Liu, A.Y. (1998). "School Children's Participation Behavior in Vietnam: An Empirical Analysis," Paper presented at the Twelfth Annual Conference of the European Society For Population Economics, Amsterdam, Netherlands.

Maddala, G.S. (1983). Limited Dependent and Qualitative Variables in Econometrics: New York: Cambridge University Press.

Mamadou, Thiam, .(2009). How changes in Schooling Affect Child Labor: The case of 3 FTI Countries, 3, 6-7; available from http://www.educationfasttrack.org/media/library/ Education-Child-Labor.pdf.

Ministry of Education. (2010). Education Statistics Annual Abstract. Addis Ababa.

Mapaure, Clever (2009). Child labor: A universal problem from a Namibian perspective" in Oliver C Ruppel, ed, Children's Rights in Namibia, Windhoek: Konrad Adenauer Stiftung.

Muhumuza, Tony. (2012). Access to Product Markets and Child Labor-Survey Evidence from Rural Uganda.

Nielsen, H. S. (1998). "Child Labor and Schooling in Zambia," The World Bank. Working Paper.

Nielson, H and A, Dubey. (2002). Child Labor in Rural India: A Micro-Economic Perspective; *The Indian Journal of Labor Economics*, Vol.45 (3).

Nkamleu, G.B. (2009). Determinants of Child Labor and Schooling in the Native Cocoa Households of CÔte d'Ivore. AERC Research Paper No. 190.

O'Donnell, O., Rosati, F.C., and van Doorslaer, E. (2005). Health effects of child work: Evidence from rural Vietnam. Journal of Population Economics 18, 437–467.

Okpukpara B.C. and Odurukwe N. (2006). Incidence and determinants of child labor in Nigeria: Implications for poverty alleviation. AERC Research Paper, 156 African.

Omokhodion, F. O., S. I. Omokhodion, and T. O. Odusote. (2006). Perceptions of Child Labor Among Working Children in Ibadan, Nigeria. Child: Care, Health & Development 32(3):281286.

Owolabi, Elizabeth Folake. (2012). Child abuse and sustainable development in Nigeria. African Journal of Social Sciences. Volume 2 No.2, pp. 108-119.

Ravallion, M. and Wodon, Q. (2000). Does Child Labor Displace Schooling? Evidence on Behavioral Responses to an Enrollment Subsidy, *Economic Journal*, 110 462, 158–175.

Ray, Ranjan. (2000). "Child Labor, Child Schooling and their Interaction with Adult Labor: Empirical Evidence for Peru and Pakistan," *The World Bank Economic Review*.

Ray, Ranjan. (2001).Simultaneous analysis of Child Labor and Child Schooling: Comparative Evidence from Nepal and Pakistan. Schools of Economics, University of Tasmania, Australia.

Rena, R. (2009). The Child Labor in Developing Countries: A Challenge to Millennium Development Goals. *Indus Journal of Management & Social Sciences* 3(1): 1-8.

Rickey, Lindsay. (2009). The Determinants of Child Labor and Schooling in the Philippines. Department of Economics, Stanford University.
Rogers, C.A. and Swinnerton, K.A. (2004). Does Child Labor Decrease When Parental Incomes Rise? *Journal of Political Economy*, University of Chicago Press, vol. 112(4), 939-968, August.

Rosati, Furio Camillo and Zafiris Tzannatos. (2000). "Child Labor in Vietnam," The World Bank. Working Paper No. 14.

Rosati, Furio Camillo and Zafiris Tzannatos. (2006). "Child Labor in Vietnam," *Pacific Economic Review*, 11(1): pp. 1-31.

Rubalcava, Luis, Graciela Teruel, and Duncan Thomas. (2009). "Impacts of the Oportunidades Program: Investments, Time Preferences, and Public Transfers Paid to Women," *Economic Development and Cultural Change*, April 57(3): pp. 507-38.

Sasaki, M. and T. Temesgen. (2000). "Children in Different Activities: Child Labor and Schoolingin Peru," Mimeo, The World Bank.

Schady, Norbert and Maria Caridad Araujo. (2006). "Cash Transfers, Conditions, School Enrollment, and Child Work: Evidence from a Randomized Experiment in Ecuador," The World Bank. World Bank Policy Research Working Paper No. 3930, June.

Serwadda-Luwaga, James. (2005). Child labor and scholastic retardation A thematic analysis of the 1999 Survey of Activities of Young People in South Africa. Thesis MA (Demography) University of Pretoria.

Transitional Government of Ethiopia. (1993). Labor Proclamation No.42/1993. Negarit Gazeta, No.27, AddisAbaba.

United Nations General Assembly. (1948). Universal Declaration of Human Rights. Resolution 217UNDoc.A/64.Finalauthorizedtextavailablegopher://gopher.undp.org/00/unearth/rights.txt.

UN. (1989). United Nations Convention on the Rights of the Child. http://www.unicef.org/crc/

UNICEF. (2009). Website 'Child protection from violence, exploitation and abuse'. Retrieved from http://www.unicef.org/protection/index childlabour.html.

Weston, Burns H. (2005). Child labor and Human Rights, Making Children Matter (Lynne Rienner Publishers, Inc USA).

Woldehanna Tassew, Bekele Tefera, Nicola Jones, and Alebel Bayrau. (2005). Child Labor, Gender Inequality, and Rural/Urban Disparities: How Can Ethiopia's National Development Strategies be revised to address negative Spill-over Impacts on Child Education and Wellbeing? Young Lives Working Paper No.20.

World Bank. (2005). World Development Indicators. World Bank, Washington DC.

World Bank.(2009). World Development Indicators. World Bank, Washington DC. www.ilo.org.

ANNEXES

Annex 1: Hausman Test for IIA Assumption

Ho: Odds (Outcome-J vs. Outcome-K) are independent of other alternatives.

Omitted	chi^2	df	$P>chi^2$ evidence
1	-51. 184	74	1.000 for Ho
2	-29. 628	73	1.000 for Ho
3	10. 29 7	68	1.000 for Ho

The test result is found to be in favor of the null hypothesis that the outcomes are independent of other alternatives as has been evidenced by the highest P-values for all the four categories alike. This provides the evidence that the independence of irrelevant alternatives assumption has not been violated and hence the use of MNL model is validated.

Annex 2: Pair-Wise Correlation Table for Variables Used in the Model

	Child-Age	Child-Age2	Child-Sex	Bio-Child	Head-Age	Head-Lit	$Head_{1-6}$	$Head_{7-12}$
Child-Age	1							
Child-Age2	0.9659	1						
Child-Sex	0.0881	0.0021	1					
Bio-Child	0.0216	0.0792	0.0087	1				
Head-Age	0.0684	0.0970	- 0.0042	-0.6238	1			
Head-Lit	-0.0006	-0.0024	-0.0085	0.1368	-0.2336	1		
$Head_{1-6}$	-0.0371	-0.0853	-0.0250	0.1727	-0.1134	0.4388	1	
$Head_{7-12}$	-0.009 1	-0.0072	0.0261	0.1113	-0.2247	0.3716	-0.2947	1
#HH-Size	-0.035 4	-0.0341	-0.048 6	0.1443	0.056 7	0.1267	0.1761	0.1843
#M_{15-65}	0.0064	0.006 3	-0.0614	0.0542	0.1539	0.1314	0.0552	0.0463
#F_{15-65}	0.0457	0.0448	0.0391	-0.0772	0.2050	-0.0265	-0.0190	0.0175
#Females	-0.0238	-0.0216	-0.352 2	0.0669	0.0369	0.088 6	0.0855	0.0624
#Infant<5	-0.0674	-0.0635	-0.0151	0.0757	-0.1951	0.0654	0.0880	0.0960
Depratio	-0.0246	-0.0294	-0.0118	-0.2249	0.2617	-0.0831	-0.0417	-0.0119
#P.Lands	0.0412	0.0420	-0.0214	-0.0063	0.0562	0.1879	0.0251	0.1037
L.Size	0.006 2	0.0050	0.023 6	0.0413	-0.0161	0.0743	0.0760	-0.0112
Off-farm	0.0257	0.0265	0.0005	0.0342	-0.0451	0.0539	-0.0063	-0.0192
Busi	0.0087	0.0047	-0.0145	0.0545	-0.0498	0.0340	0.0171	0.0927
Remit	-0.0343	-0.0333	-0.007 2	-0.0678	0.093 2	-0.0968	-0.0282	0.0096
L.Sharing	0.0610	0.016 3	-0.055 1	-0.0110	-0.0517	0.1449	0.0373	0.0034
Sch-Exp	0.0001	0.0000	-0.0721	0.023 4	0.0276	0.0687	0.0522	0.0871
Dis-Sch	-0.0084	-0.0043	0.0151	-0.097 6	0.1770	-0.0935	-0.05 8	-0.0059
Child Activity	-0.1748	-0.1237	0.2734	-0.0075	-0.0026	-0.0698	-0.0565	-0.0918
#Oxen	0.0154	0.0154	-0.0691	-0.0454	0.0415	0.0755	-0.0375	0.0482
#Oze	0.0008	0.0008	-0.0222	-0.002 8	0.0672	0.0099	-0.0129	-0.0185
Head-Sex	-0.0181	-0.0091	0.0472	0.2231	0.0353	0.3645	0.1869	0.1446

Annex 2: Continued

	#HH-Size	#M_{15-65}	#F_{15-65}	#Females	#Infants<5	Depratio	#P.Lands	L.Size
#HH-Size	1							
#M_{15-65}	0.122 0	1						
#F_{15-65}	0.1220	0.1260	1					
#Females	0.1220	0.2387	0.2102	1				
#Infants<5	0.1022	0.1039	0.1096	0.1072	1			
Depratio	0.1022	0.1039	0.1096	0.1072	-0.0585	1		
#P.Lands	0.1031	0.1915	0.1588	0.0187	-0.0658	-0.1059	1	
L.Size	0.1031	0.1915	0.1588	0.0187	-0.0658	-0.1059	0.3642	1
Off-farm	0.0156	0.0761	0.0700	0.0952	0.0743	-0.0023	0.0858	-0.0872
Business	-0.0098	0.0487	-0.0440	-0.0715	-0.0638	-0.0278	0.0064	-0.0833
Remit	-0.0311	-0.0774	0.057 2	0.0833	- 0.0325	0.0234	-0.0439	0.0407
L.Sharing	0.0365	0.0379	-0.0018	0.0752	0.0498	-0.0262	0.2696	-0.0611
Sch-Exp	0.1022	0.1039	0.1096	0.1072	-0.0585	-0.0245	0.1726	0.0522
Dis-Sch	0.0194	0.0561	-0.0076	0.0067	-0.0039	0.0312	0.1214	-0.0034
Child Activity	-0.0926	-0.0795	-0.0485	-0.1941	0.0841	0.053 2	-0.0638	-0.0091
#Oxen	0.0036	0.0198	0.0519	0.0348	-0.315	-0.0411	0.2971	0.0113
#Oze	0.0081	0.0624	-0.0021	-0.0134	-0.0284	-0.0178	0.0276	-0.0091
Head-Sex	0.2097	0.3334	-0.0327	0.0827	0.03 6	-0.0097	0.1816	0.0239

Annex 2: Continued

	Off-farm	Busi	Remit	L.Sharing	Sch-Exp	Dis-Sch	Child Activity
Off-farm	1						
Busi	0.0920	1					
Remit	0.0543	0.0231	1				
L.Sharing	0.3057	-0.0547	-0.1194	1			
Sch-Exp	-0.0097	0.0516	-0.06 50	-0.0064	1		
Dis-Sch	0.1036	0.0635	0.1015	0.0832	0.1027	1	
Child Activity	-0.0171	-0.0076	0.044 8	-0.0347	-0.0157	-0.0077	1
#Oxen	0.0286	-0.0548	-0.1686	0.0419	0.0677	-0.0348	-0.1667
#Oze	0.0912	0.0861	-0.0718	0.0873	0.0967	0.0893	-0.0821
Head-Sex	0.025 2	0.1014	-0.0564	0. 8051	0.2025	0.4101	-0.0456

Annex 2: Continued

	#Oxen	#Oze	Head-Sex
#Oxen	1		
#Oze	0.0171	1	
Head-Sex	0.0454	0.0183	1

Source: computed from own data survey result, 2014.

Annex 3: Marginal Effects on the Probabilities of Work- School Attendance Outcomes for All Children Combined

Variable	School and Work		Work Only	
	Marginal Effect (Std. Err).		Marginal Effect (Std. Err.)	
	Child Characteristics			
Child-Age	0.12421**	(0.0574)	-0.21204*	(0.0456)
Child-Age2	-0.00561**	(0.0012)	0.01211*	(0.0032)
Child-Sex	0.35627*	(0.0222)	0.03232	(0.0233)
Bio-Child	0.07075**	(0.0314)	-0.08172**	(0.0330)
Household Characteristics				
Head-Age	0.00054	(0.0021)	-0.00056	(0.0021)
Head-Sex	-0.04391	(0.0390)	0.04151*	(0.0208)
Head-Lit	-0.00281	(0.0371)	-0.00387	(0.0421)
$Head_{1-6}$	0.00897	(0.0390)	-0.08912**	(0.0352)
$Head_{7-12}$	-0.00621	(0.0273)	-0.10827*	(0.0381)
#HH-Size	0.00978	(0.0118)	-0.02875*	(0.0118)
$\#Male_{15-65}$	0.00768	(0.0176)	0.00838	(0.0162)
$\#Female_{15-65}$	0.01331	(0.0179)	0.00558	(0.0114)
#Females	0.00941	(0.0139)	-0.00361	(0.0157)
#Infants<5	-0.01542	(0.0287)	0.05540**	(0.0258)
Depratio	0.02588	(0.1419)	-0.13077	(0.1324)
Household Asset				
#P.Lands	0.01041**	(0.0051)	0.00031	(0.0033)
L.Size	0.00112	(0.0001)	-0.00089	(0.0024)
#Oxen	-0.00933	(0.0120)	-0.00257	(0.0202)
#Oze	0.00054	(0.0003)	-0.00012	(0.0037)
Off-farm	-0.00230	(0.0268)	0.01008	(0.0262)
Business	0 .01161	(0.0233)	-0.02014	(0.0462)
Remit	-0.0416***	(0.0251)	0.09754***	(0.0219)
L.Sharing	0.03182**	(0.0401)	-0.05711**	(0.0791)
School Related Factors				
Sch-Exp	0.00011	(0.0018)	-0.00045	(0.0012)
Dis-Sch	0.04075*	(0.0063)	-0.01966*	(0.0048)
Model Summary Statistics For All Children Combined				
Number of Observations	192			
Number of Iterations	10			
Log Likelihood Function	-1768.3577			
Restricted Log Likelihood	-1978.045			
Chi-Squared	945.723			
Significance Level	0.0000			

Source: Computed from own data survey result, 2014.

Figures in parenthesis are standard errors.

*, **, and ***: Represent significance levels at 1%, 5% and 10% respectively.

Annex 4: Marginal Effects on the Probability of Work-School Participation for Girls

Variables	School and Work		Work Only	
	Marginal Effect (Std. Err.)		Marginal Effect (Std. Err.)	
	Child Characteristics			
Child-Age	-0.00418	(0.0304)	-0.30992*	(0.0688)
Child-Age2	-0.00805	(0.0023)	0.01306*	(0.0021)
Bio-Child	0.00674	(0.0289)	0.00996	(0.0413)
Household Characteristics				
Head-Age	-0.02739	(0.0315)	0.00134	(0.0061)
Head-Sex	-0.01305	(0.0357)	0.05010	(0.0384)
Head-Lit	-0.03882	(0.0371)	-0.01910	(0.0469)
$Head_{1-6}$	0.04179	(0.0652)	-0.01087	0.0459)
$Head_{7-12}$	-0.03739	(0.0345)	-0.03178	(0.0521)
#HH-Size	-0.01208	(0.0148)	-0.05196*	(0.0137)
$\#Male_{15-65}$	0.02044	(0.0151)	0.01108*	(0.0251)
$\#Female_{15-65}$	0.05217*	(0.0178)	0.01902	(0.0209)
#Females	0.00295	(0.0156)	0.01587	(0.0176)
#Infants<5	0.01098	(0.0283)	0.09848*	(0.0309)
Depratio	0.0354	(0.1438)	-0.42792**	(0.1129)
Household Asset				
L.Size	-0.00616*	(0.0016)	0.00128*	(0.0005)
#P.Lands	0.01095*	(0.0096)	-0.01041	(0.0051)
#Oxen	-0.00052	(0.0254)	0.00635	(0.0177)
#Oze	-0.00866	(0.0077)	0.00065	(0.0002)
Off-farm	-0.02405	(0.0375)	0.03009	(0.0083)
Business	0.02403	(0.0287)	-0.02327	(0.0313)
Remit	-0.02019	(0.0232)	0.07221**	(0.0348)
L.Sharing	0.04204	(0.0281)	-0.06079***	(0.0351)
School Related Factors				
Sch-Exp	0.00581	(0.0013)	-0.00927***	(0.0053)
Dis-Sch	0.01058	(0.0094)	-0.00912	(0.0041)
Model Summary Statistics For Girls				
Number of Observations	97			
Number of Iterations	17			
Log Likelihood Function	-977.7544			
Restricted Log Likelihood	-1221. 546			
Chi-Squared	503. 55			
Significance Level	0.0000			

Source: Computed from own data survey result, 2014.

Figures in parenthesis are standard errors.

*, **, and *** represent significance levels at 1%, 5% and 10% respectively.

Annex 5: Marginal Effects on the Probabilities of Work- School Participation for Boys.

Variable	School and Work		Work Only	
	Marginal Effect (Std. Err.)		Marginal Effect (Std. Err.)	
	Child Characteristics			
Child-Age	0.41885*	(0.0006)	-0.31260*	(0.0093)
Child-Age^2	-0.01266*	(0.0034)	0.01504*	(0.0036)
Bio-Child	0.15067*	(0.0575)	-0.16415*	(0.0031)
Household Characteristics				
Head-Age	-0.05186**	(0.0464)	-0.00626	(0.0064)
Head-Sex	0.02543	(0.0515)	0.13498*	(0.0339)
Head-Lit	0.01021	(0.0516)	-0.01014	(0.0516)
$Head_{1-6}$	-0.00691	(0.0727)	-0.11308*	(0.0439)
$Head_{7-12}$	-0.09261**	(0.0464)	-0.16143*	(0.0383)
#HH-Size	0.02044	(0.0164)	-0.01315	(0.0188)
$\#Male_{15-65}$	0.00109	(0.0203)	-0.02914	(0.0226)
$\#Female_{15-65}$	-0.01657	(0.0253)	0.00476	(0.0238)
#Females	0.02004	(0.0137)	-0.02027	(0.0176)
#Infants<5	-0.05591	(0.0066)	0.03456	(0.0358)
Depratio	0.04612	(0.2341)	0.00322	(0.2003)
Household Asset				
L.Size	0.00077	(0.0002)	-0.00704	(0.0021)
#P.Lands	0.01110	(0.0031)	-0.00137	(0.0078)
#Oxen	-0.00325	(0.0154)	-0.00945	(0.0404)
#Oze	0.01029*	(0.0037)	0.00306**	(0.0085)
Off-farm	0.02644	(0.0354)	0.00503	(0.0391)
Business	0.01041	(0.0309)	-0.01251	(0.0331)
Remit	-0.01976	(0.0374)	0.01603	(0.0337)
L.Sharing	0.06378	(0.0421)	-0.02616	(0.0335)
School Related Factors				
Sch-Exp	0.00051	(0.0002)	-0.00916	(0.0026)
Dis-Sch	0.04032*	(0.0122)	-0.02731*	(0.0023)
Model Summary Statistics For Boys				
Number of Observations	95			
Number of Iterations	9			
Log Likelihood Function	-13 12.6545			
Restricted Log Likelihood	-1295.754			
Chi-Squared	435.553			
Significance Level	0.0000			

Source: Computed from own data survey result, 2014.

Figures in parenthesis are standard errors.

*, **, and ***: Represent significance levels at 1%, 5% and 10% respectively.

Annex 6: Estimated Result of the Multinomial Logit Equation

Multinomial Logistic Regression					Number of Obs. = 192	
					LR $chi^2(50)$ = 421.33	
					Prob > chi^2 = 0.0000	
Log Likelihood = -17.101453					Pseudo R^2 = 0.9255	
Child Activity						
School & Work	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**[95% Conf.**	**Interval]**
Child-Age	.48530	(.040121)	3.55	0.032**	.666675	.187354
Child-Age2	-.32 83	(.01 8976)	-1.12	0.035**	-.536363	.00 0065
Child-Sex	-.62761	(.027654)	-4.12	0.007*	-.393030	.068 567
Bio-Child	.87022	(.01 2346)	3.34	0.043**	-.539333	.8 97823
Head-Sex	-.57363	(.018 546)	-1. 33	0.155	-.128665	.708467
Head-Age	-.00074	(.0 12347)	-0.08	0.999	-.098887	.085034
Head-Lit	.57892	(.01 9875)	0.75	0.581	-.076449	.256008
Head1-6	.56345	(.011230)	0.91	0.309	-.710933	.868453
Head7-12	-.13345	(.015034)	-0.09	0.983	-.027817	.812969
#HH-Size	.66136	(.043822)	0.94	0.359	-.478974	.272498
$\#Male_{15-65}$	.30625	(.012136)	1.90	0.455	-.092757	.684965
$\#Female_{15-65}$	.00846	(.024122)	1.62	0.106	-.424296	.441231
#Females	-.04681	(.013183)	-0.92	0.355	-.265166	.171536
#Infants < 5	.46945	(.015162)	0.46	0.644	-.520231	.459132
Depratio	.07156	(.032295)	0.22	0.825	-.561325	.704455
#Oze	-.33081	(.061927)	-2.25	0.132	-.544575	-.117059
#Oxen	-.40436	(.051761)	-2.18	0.435	-.418886	.782673
L.Size	.43472	(.020097)	1.71	0.148	-.504353	.379756
#P.Lands	-.22272	(.015518)	-0.79	0.042**	-.264275	.890754
Off-farm	.26755	(.011854)	0.02	0.983	-.296662	.35 1278
Business	-.26193	(.018986)	-0.66	0.555	-.898345	.459 123
L.Sharing	-.73651	(.016856)	-2.99	0.042**	-.040239	.567 235
Remit	-.62236	(.015778)	-2.03	0.086***	-.714853	.674567
Dis-Sch	-.22097	(.084741)	-4.51	0.000*	-.881876	.423478
Sch-Exp	-.04071	(.045684)	-0.09	0.802	-.977456	.845671
Cons.	-1.9670	(.026204)	3.94	0.000	-.334529	.555342
Work Only	**Coef.**	**Std. Err.**	**z**	**P>z**	**[95% Conf.**	**Interval]**
Child-Age	.31234	(.016686)	-0.08	0.004*	-.312759	.326980
$Child\text{-}Age^2$	.16567	(.077949)	0.05	0.008*	-.1 12375	.152795
Child-Sex	-.13340	(.059267)	-0.07	0.912	-.11 2347	.116136
Bio-Child	-.15121	(.057637)	-0.12	0.040**	-.1 91236	.112956
Head-Sex	.36373	(.056642)	4.43	0.000*	-.111058	.110976
Head-Age	.13457	(.049782)	0.08	0.309	-.975666	.975855
Head-Lit	- .78956	(.011416)	-0.16	0.841	-.223742	.223786
$Head_{1-6}$	-.00516	(.058030)	-3.51	0.012**	-.113799	.113677
$Head_{7-12}$	-.04596	(.046413)	-7.43	0.000*	- .909717	.909645
#HH-Size	-.53809	(.038691)	-6.76	0.000*	-.758734	.757925
$\#Male_{15-65}$	-.63480	(.026373)	-0.07	0.548	-.516943	.516886
$\#Female_{15-65}$	-.33781	(.057277)	-0.09	0.549	-.112255	.112269
#Females	-.01906	(.021341)	-0.07	0.998	-.417779	.418815
#Infants < 5	.81852	(.047633)	0.15	0.027 **	-.932959	.934245
Depratio	.02263	(.015853)	0.32	0.652	-.310744	.310705
#Oze	.40193	(.095179)	0.56	0.543	-.186563	.186516
#Oxen	-.23432	(.016475)	-0.43	0.999	-.323063	.322773
L.Size	.74207	(.070589)	0.74	0.382	-.138391	.138316
#P.Lands	.10661	(.045314)	0.65	0.453	-.888075	.888224
Off-farm	-.55802	(.035377)	-0.34	0.345	-.693275	.693564
Business	-.10054	(.012347)	-0.23	0.545	-.123467	.137488
L.Sharing	.13228	(.014393)	0.54	0.045**	-.324510	.282091
Remit	-.86480	(.040571)	-0.43	0.076***	-.789100	.794734
Dis-Sch	.35673	(.023412)	0.05	0.000*	-.700081	.900904
Sch-Exp	.06745	(.012223)	0.08	0.978	-.226534	.262965
Cons.	1.33764	(.033451)	5.57	0.000	-.14 3435	.156754
School Only (Base Category)						

Source: Computed from own data survey result, 2014

*, **, and ***: Represent significance levels at 1%, 5% and 10% respectively.

Annex 7: Summary Descriptive Statistics of Variables Used in the Model.

Variable	No. of Obs.	Mean	Std. Dev.	Minimum	Maximum
Child-Age	192	11.601223	2.6247948	7	14
Child-Age^2	192	127.30075	46.939357	49	196
Child-Sex	192	0.5931640	0.4951398	0	1
Bio-Child	192	0.8286214	0.3855830	0	1
Head-Age	192	50.185137	13.028740	14	99
Head-Sex	192	0.7533818	0.4873130	0	1
Head-Lit	192	0.6830115	0.4865158	0	1
$Head_{1\text{-}6}$	192	0.2654447	0.4971473	0	1
$Headab_{7\text{-}12}$	192	0.1133855	0.3525451	0	1
#HH.Size	192	7.3298234	2.3177623	2	16
$\#Male_{15\text{-}65}$	192	1.8696915	1.1732001	0	7
$\#Females_{15\text{-}65}$	192	1.8695015	0.9266924	0	6
#Females	192	3.6240356	1.600893	2	11
#Infants<5	192	0.7157336	0.8612676	0	4
Depratio	192	0.1352184	0.1262284	0	0.75
L.Size	192	1.1753453	14.661300	0	2
#P.Lands	192	1.5932489	1.0852600	0	4
#Oxen	192	0.9938470	1.2062440	0	5
#Oze	192	8.1651378	139.67730	3.9	152.5
Off -farm	192	0.5235516	0.4969496	0	1
Business	192	0.3904448	0.4967687	0	1
Remit	192	0.4966216	0.5109300	0	1
L.Sharing	192	0.4371406	0.4583496	0	1
Sch-Exp	192	27. 052558	116.96990	0	373
Dis-sch	192	21.4847830	1.7245810	7	65
Child Activity	192	1.94294665	0.8078841	1	3

Source: Computed from own data survey result, 2014.

The standard livestock conversion units are taken from Storck, et al, 1991 as cited in Assefa. Calf=0.25, heifer/bull=0.75, cows/oxen=1, horse=1.10, donkey/mule=0.70, camel=1.25, sheep/goat=0.13 & chicken=0.013.

Annex 8: Research Questionnaire

This questionnaire is prepared to collect data from rural household heads for the purpose of studying Socio-Economic Factors Affecting Child Labor and Schooling in Hintalo-Wejerat Woreda of Rural Tigray, Ethiopia.

General Instructions for Enumerators

i. Firstly, introduce yourself with the respondents.
ii. Make them clear with the purpose and objective of the study.
iii. Aware them (respondents) that the information they provide is with their own capacity and freedom and it will be kept confidentially.
iv. Ask each question clearly and patiently until respondents understand the idea.
v. Fill up an interview schedule according to the exact response you get from the respondents (do not put your own opinion).
vi. Put the exact answers of each respondent both on the space provided and encircle the choice item.
vii. Give thanks in advance for respondents for reflecting the reality and time consideration before you start and after you finish questioning so as to make things go smoothly.

Administrative Location of the Household Head:

Region_____Woreda_____Tabia_____

Part One: Household Characteristics

1.1)Would you mind telling the household's Characteristics?

No	Name Of Household Members Including the Household Head	Sex: 1=Male 2=Female	Age:	Marital Status: 1=Single, 2=Married, 3=Divorced, 4=Widowed, 5=Other (Specify)	Biological R/ship to the Household Head: 1=Son, 2=Daughter 3=Brother 4=Sister 5=Grandchild 6=Other(Specify)	Education Status of each Household member: 0=Illiterate 1= Grade 1-6, 2=Grade7-12, 3= Above 12th Grade	Occupation: 1=Farmer,2= Trader, 3=Housewife, 4=Handcraft, 5=Construction,6=Weaving,7=Carpenter, 8=Student, 9=Herding, 10=Other (Specify)	Current Schooling Participation: 1=Schooling only, 2=Schooling and Working , 3=Working only	With whom does each household live/ 1= With mother 2= With father 3= With brother/sister 4= With son/daughter 5= With grandmother/ grandfather 6= With uncle/aunt 7=other(specify)
1									
2									
3									
4									
5									
6									
7									
8									

9									
10									
11									
12									

Part Two: Household Expenditure and Income Status

2.1) Would you mind telling the household's expenditure in the year 2005E.C.

No	Types of Household Expenditure	Amount(inBirr)	
		Birr	Cents
1	Food items(crops, sugar, salt, coffee, oil, etc)		
2	Livestock and livestock products (For buying Oxen, cows, Goat, Sheep, Donkey, Poultry, Camels, Bees, Butter, Milk, etc)		
3	Child Schooling inputs (pen, pencil, note books, books etc) and School uniform		
4	Clothing		
5	Hygiene and sanitations(soap and water, etc)		
6	Housing (rent, repairing etc)		
7	Clean water		
8	Electricity		
9	Other Expenses		
10	Total		

2.2) Would you mind estimating the household's income in the year 2005E.C?

No	Household Income and Sources	Amount(inBirr)	
		Birr	Cents
1	From agricultural harvest (wheat, barley, teff, maize, sorghum, etc)		
2	From sales of livestock and livestock products (For buying Oxen, cows, Goat, Sheep, Donkey, Poultry, Camels, Bees, Butter, Milk, etc)		
3	From off-farm activities (Daily laboring, Trading, Construction, Handcraft, Weaving, Carpenter, Smith, etc)		
4	From house rent		
5	From remittance		
6	From social cash transfer		
7	From safety-net support program?		
8	From other sources of income		
9	Total annual household income in 2005 E.C		

Part Three: Schooling Information

3.1) Average distance to the nearest primary school in minutes is _____.

3.2) How often does/do the household's child/ children go to school? (1) Once a week (2) Twice a week (3) Thee Times a week (4) Four times a week (5) Every Day (6) Never go to school

3.3) Can you identify any reason for not sending your child to school every day?(if so) (1) School distance (2) Child labor demand (3) Inability to pay costs of schooling (4) Lack of awareness (5) All (6) Others(specify)_____ .

3.4) How many of the household children have dropped out schooling since 2003E.C (If any) Female ____Males____Total____

3.5) Please indicate reasons why they dropped out? (1) Marriage (2) Parents' demand to child labor (3) Lack of awareness (4) Parents are unable to cover schooling costs (5) Children's interest to schooling is low (6) School distance (7) Other (specify) _____.

Part Four: Household Land, Labor, &Livestock Assets

4.1) Does the household have a farm land? (1) Yes (2) No

4.2) If the answer for (Qn. 4.1) is yes, how many total hectares of land? _____.

4.3) How many plots of land does the household own? (1) 1 (2) 2 (3) 3 (4) 4 and above

4.3) Does the household have irrigation scheme? (1) Yes (2) No

4.3) How does the household operate farming activity? (1) Using own oxen (2) By borrowing oxen from others (3) By Coupling an oxen with others (4) Other (specify)_____.

4.4) Did the household ever face shortage of oxen since 2003E.C? (1) Yes (2) No

4.5) If yes, how much total hectare of land was not covered by crops during the past three years due to lack of oxen? _____.

4.6) Does the household cultivate other household's land? (1) Yes (2) No

4.7) If yes, specify the total land size you cultivated in hectares in 2005E.C? _____.

4.8) Did the household ever face labor shortage? (1) Yes (2) No

4.9) If yes, how did you solve the problem of labor shortage? (1) By hiring labor (2) By Labor exchange (sharing) (3) Using child labor (4) Others (specify) _____

4.10) Does the household have livestock ? (1) Yes (2) No

4.11) If yes please tell the number of livestock by type that the household owned in 2005E.C:

	Types of livestock the household own												
	Oxen	cows	Bull	Heifers	Calves	Goats	Sheep	Mule	Donkey	Bees	Poultry	Camels	Total
No													

4.12)Who is responsible to look after the livestock? (1) Parents (2) Own Children (3) Hired Laborer (4) Other(Specify)_____

4.13) If own children for (Qn.4.12), when? (1) During Working days (2) During Weekend (3) Both (4) Other (Specify)_____.

Part Five: Household Saving and Credit Conditions

5.1) Does the household save money regularly? (1) Yes (2) No

5.2) If yes, indicate total amount in birr that the household saved in 2005E.C _____.

5.3) Where do you save (put) the money in time of saving? (1) Commercial Bank (2) DECSI (3) At home in hand (3) Other (Specify)_____.

5.4) If no, for (Qn.5.1) why? (1) Nothing to save (2) No need of saving (3) Other (Specify)_____

5.5) Does the household have taken out a loan (credit) since 2003E.C? (1) Yes (2) No

5.6) If yes, how much in birr totally ? _____.

5.7) What are the Sources of the household's credit? (1) Service cooperative (2) Commercial Bank(3) DECSI (4) Friends and Relatives (5) Local Money Lenders (6) Others (specify) _____.

5.8) If your answer is No (Qn.5.5) , why? (1) Lack of access to credit services (2) No need for Credit (3) Threat for high interest rate (4) others (specify) _____.

Part Six: Household Access to Services

6.1) Does the household have its own house? (1) Yes (2) No

6.2) If yes, total number of rooms? _____.

6.3) Indicate the nature of the house's wall? (1) Stone (2) Wood (3) other (specify) _____

6.4) Does the household have access to potable water? (1) Yes (2) No

6.5) If yes, the distance to travel to fetch tap water is approximately _____minutes.

6.6) Does the household have access to electricity? (1) Yes (2) No

6.7) If no, what is the source of energy? (1) Wood (2) Charcoal (3) Fuel oil (4) All (5) Other (specify) _____.

6.8) If the answer for (Q.6.7) is wood, how do you get access to it? (1) By buying from nearby market (2) By collecting from nearby areas (3) Other (specify)_____.

Part Seven: Discussion with Administration Body of the Respective *Tabia*

7.1) Please mention the major factors that affect child work in this *tabia*?

i. _____
ii. _____
iii. _____

7.2) What are the main factors that hinder child schooling?

i. _____
ii. _____
iii. _____

7.3) Please mention and classify the type of child work in accordance to gender?

Boy's child labor	Girl's child labor

i. _____ i. _____

ii. _____ ii. _____

iii. _____ iii. _____

7.4) Who most probably get the chance of schooling in this *tabia*? 1) boys 2) girls

i. If boys, why? (please reason out)

_____

_____

ii. If girls, why? (please reason out)

_____

_____

7.5) Please tell the number and reasons of child school dropout in 2005E.C in this *tabia*?

Male___Female___Total_____.

i. Reasons for boys'

dropout:_____

_____

ii. Reasons for girls'

dropout:_____

_____

7.6) Please give any views as what interventions must be made to avoid child work and improve child schooling?

i. Views to avoid child

work:_____

_____

ii. Views to improve child

schooling:_____

_____

Thank You In Advance!!!